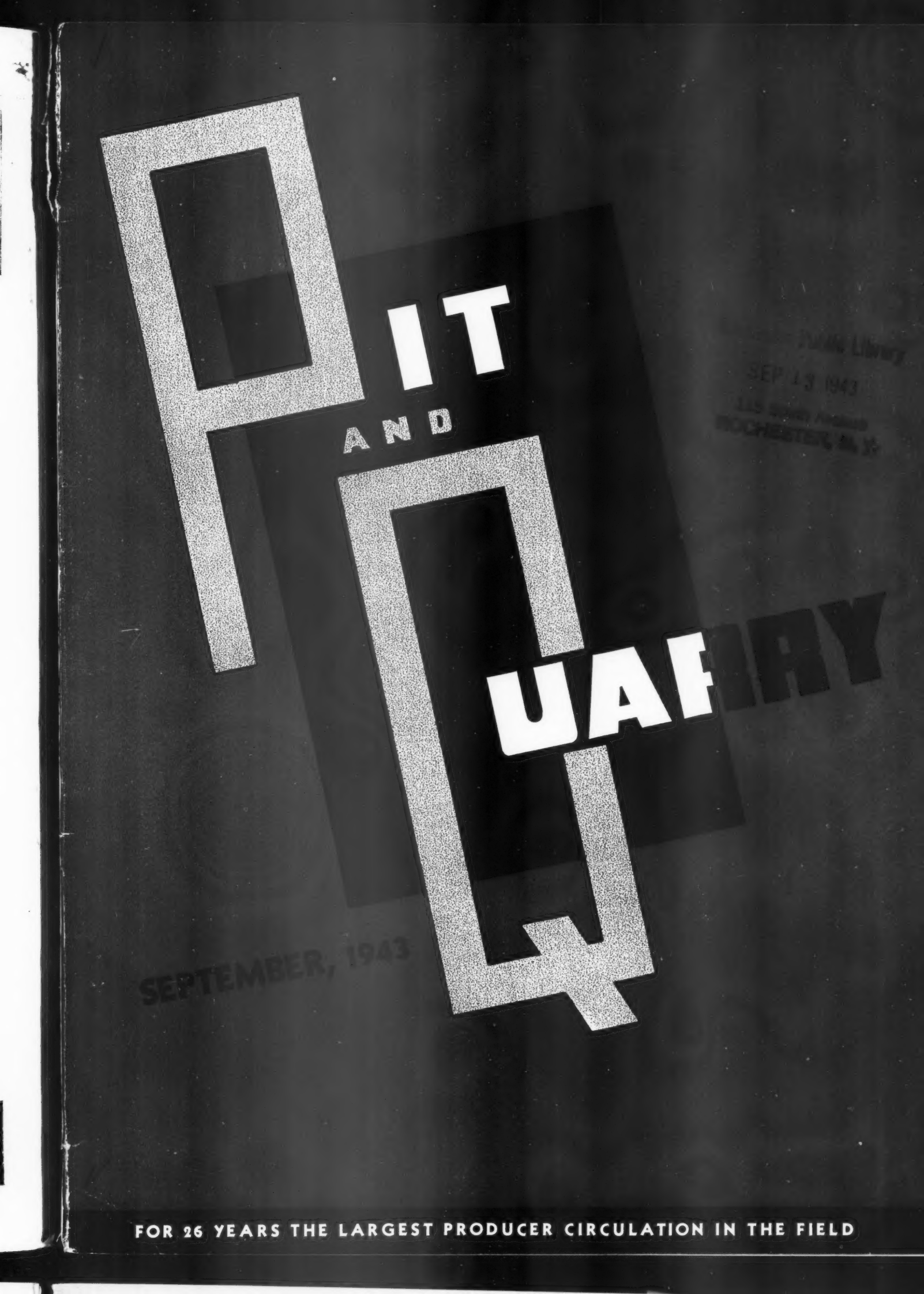
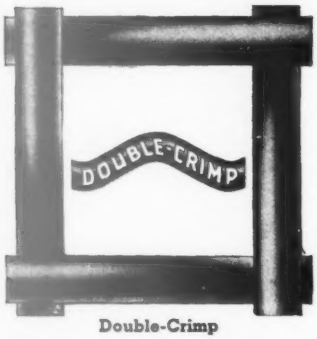
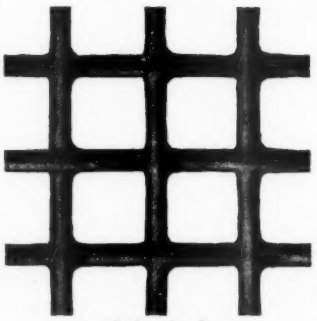

IT
AND
QUARRY
SEPTEMBER, 1943
FOR 26 YEARS THE LARGEST PRODUCER CIRCULATION IN THE FIELD



Double-Crimp

"The Perfect" Wire Cloths and Screens

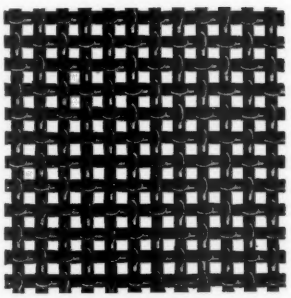


Galvanized

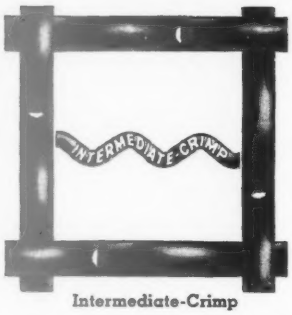
of

SUPER-LOY
STEEL
GALVANIZED STEEL
STAINLESS STEEL
NICKEL-CHROME STEEL
PHOSPHOR BRONZE
BRASS
COPPER
MONEL
NICKEL
ALUMINUM

Arch-Crimp

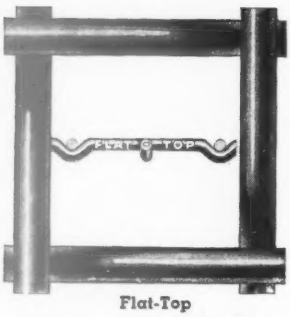


Calendered



Intermediate-Crimp

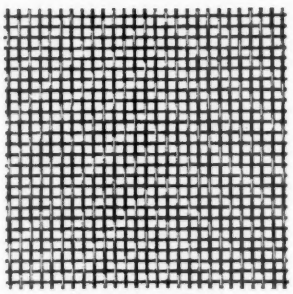
Rek-Tang



Flat-Top

•

Any Special Metal for Any Service



Herringbone Twill

"Perfect" WEAVES

Arch-Crimp
Coiled
Double-Crimp
Double-Fill
Dutch
Flat-Top
Herringbone
Intermediate-Crimp
Rek-Tang
Selvage-Edge
Straight-Warp
Stranded
Sta-Tru
Triple-Warp
Twilled
Twisted-Fill
Twisted-Warp

"Perfect" PROCESSING

Arc-Welding
Bending
Binding
Brazing
Calendering
Coiling
Crimping
Cutting
Dipping
Dishing
Finishing
Flanging
Flattening
Forming
Framing
Galvanizing
Jointing
Knuckling
Painting
Rolling
Selvaging
Shaping
Shearing
Slitting
Soldering
Spot-Welding
Squaring
Stitching
Tack Welding
Trimming

"Perfect" PRODUCTS

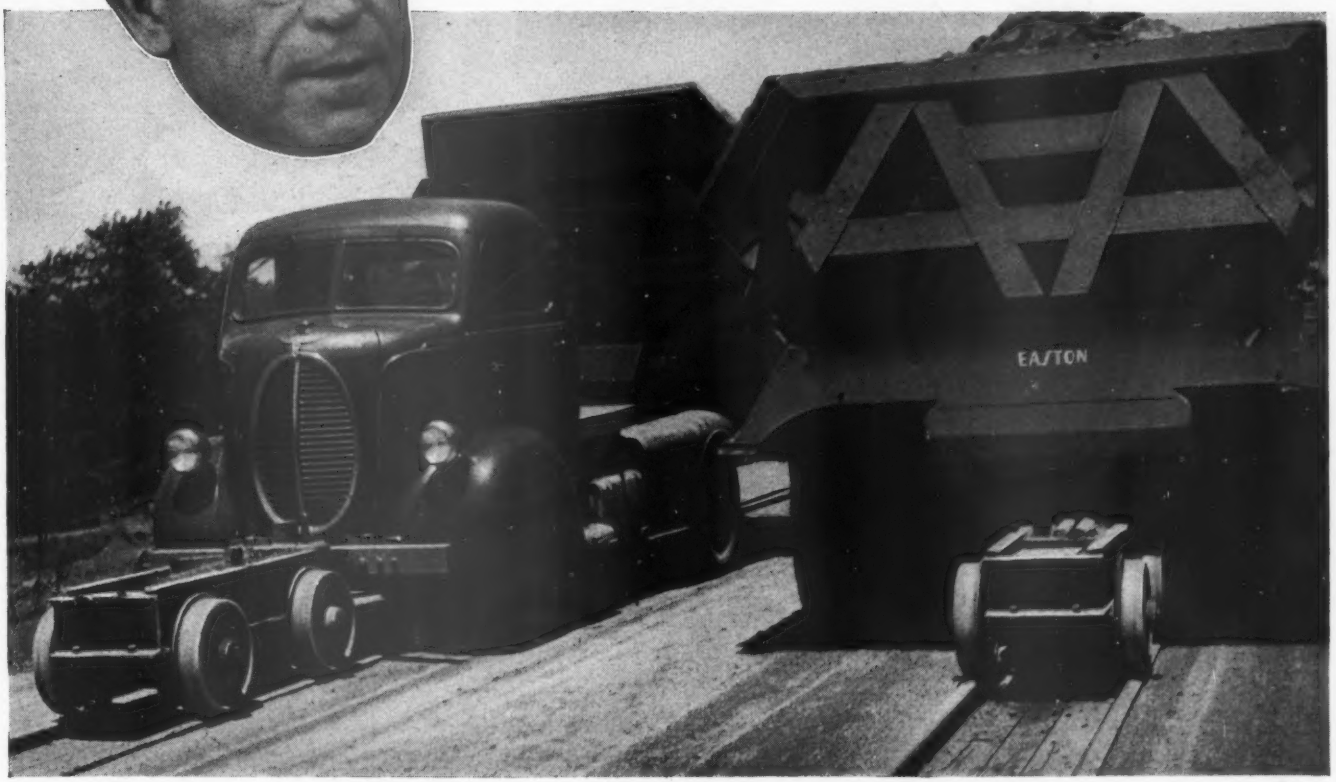
Baskets
Circles
Coils
Cones
Cylinders
Discs
Forms
Leaves
Lengths
Panels
Pieces
Ribbons
Rings
Rolls
Sections
Segments
Strips
Templates

Illustrations show items listed in bold-face type.

Other wire cloths and screens will be illustrated in subsequent advertisements of this series.

Sta-Tru

WINNER . . . **JOE Q. TAYLOR, general superintendent of a well-known quarry corporation. Mr. Taylor's new Two-Way Barney Car System, used at one of his company's quarries, was selected for first prize in the "Hints and Helps" Contest sponsored by *Rock Products*. The award, a $100 War Bond, was announced in the January 1943 issue of *Rock Products*.**



LICKS 11% GRADE

Rochester Public Library
SEP R 19
115 South
ROCHESTER, N.Y.

adds tons to each payload, saves gas and tires!

The Two-Way Barney Car System moves 15-ton payloads up an 11% incline 747 feet long in 48 seconds. Here, briefly, is how it works (see photo above). The empty tractor-trailer, coming down the dual-road incline under some of its power, pushes a barney car before it. The barney car is attached to a cable which extends to the top of the incline, runs *free* around bull wheels, and carries down the opposite side of the dual-road to a second barney car. The *push* of the empty unit on the downgrade is carried through the cable to the second barney car which *pulls* uphill against the rear axle of the loaded trailer.

Thus, one tractor-trailer unit serves to balance the other's weight on the incline, and the only power required of the two units is that which is used to raise the actual payload. The upgrade run, formerly hard on the transmissions of the tractors, and costly in gasoline and tires, is now easy and economical.

Toy trucks, toy cannon and fishing line were some of the materials used on Joe Taylor's first small-scale model of the system. But the main ingredients were 'know-how', and an expert knowledge of semi-trailer haulage. Joe Q. Taylor was one of the first quarrymen to recognize the advantages of EASTON Semi-Trailers. Today he commands a fleet of 32 EASTON TR-10's serving all four of his company's quarries.

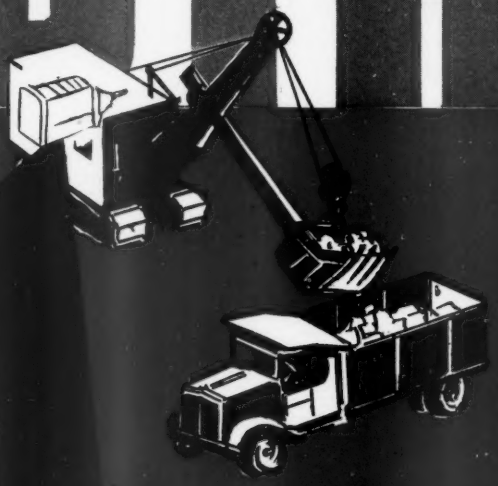
The complete story of the Two-Way Barney Car System is told in EASTON Bulletin 183. Natural color movies of the installation are available to be shown on request. EASTON can furnish complete equipment and engineering for similar installations, and can also provide useful information on many other short-cuts to conservation and bigger payloads. For a copy of Bulletin 183, or for helpful advice on your own haulage problem, write to: Engineering Counsel, Easton Car & Construction Company, Easton, Pa.

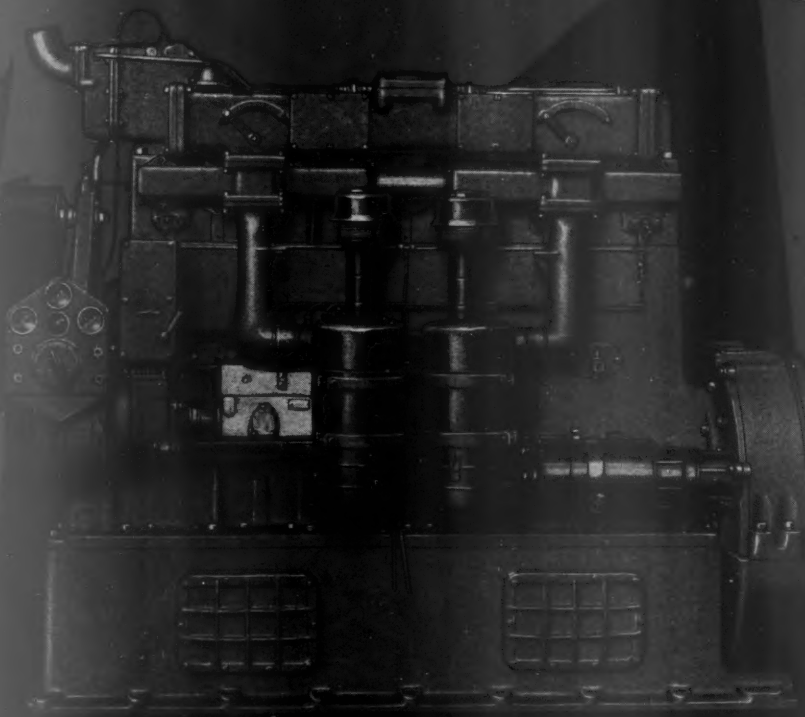
B-1005

EASTON

PIT AND QUARRY, September, 1943. Vol. 36. No. 3. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago 5, Ill. Subscription price $2 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 25 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1897.

SMOOTH





BUDA Low-Pressure DIESEL

SMOOTH as a steam-engine, a Buda Low-pressure Diesel delivers the kind of steady, vibrationless power that steps up equipment output and adds years to its life.

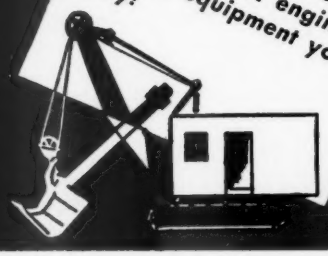
No other Diesel can offer you Buda's quick-starting, parts-saving smoothness . . . it's *your* best bet if you want Diesel fuel economy *without* the punishing vibration and high maintenance costs of ordinary high pressure Diesels!

Your Buda distributor will gladly furnish performance-proved *facts* on Buda Diesel and gasoline engines, 20 to 340 h.p. See him *now*.

ORDINARY DIESELS
. . . High cylinder pressures produce sledge-hammer blows that punish pistons, rods and crankshaft every power stroke.

BUDA Low-Pressure DIESELS
Prolonged "low-pressure" combustion delivers a smooth, steady power stroke that cuts vibration, saves parts.

Remember . . . BUDA Powered means BETTER Powered — Specify BUDA engines on the equipment you buy!



the BUDA *Co.*

Harvey (Chicago Suburb) Illinois

Feeding 80 tons per hour to a Hungry Baby

One of the 4 Lorains owned by Highland Sand & Gravel Company, feeding material into a special dry sand-screening apparatus at the company's Burlington, Mass. Pit.

THAT'S the job being performed by this Lorain-40 Crane, owned by Highland Sand & Gravel Co., West Roxbury, Mass. It works 11 hours a day, week in and week out —feeding material, loading sand into trucks, casting accumulated tailings to one side.

There's no time out on this job. Each type of handling requires 10 to 20 feet of travel to a new position—keeps the Lorain constantly on the move.

This type of high speed, high-pressure work demands a machine that can work fast, and take plenty of punishment. The ¾-yd. Lorain, like all others in ⅜ to 2-yd. Lorain line, gives you more of everything you need—power, capacity, strength, and versatility.

Why not see your Lorain distributor for complete information on the Lorain line? He is the best source for information on any new types or designs of post-war equipment and can give you up-to-the-minute advice on the latest, most efficient methods of material handling.

THE THEW SHOVEL COMPANY
LORAIN, OHIO

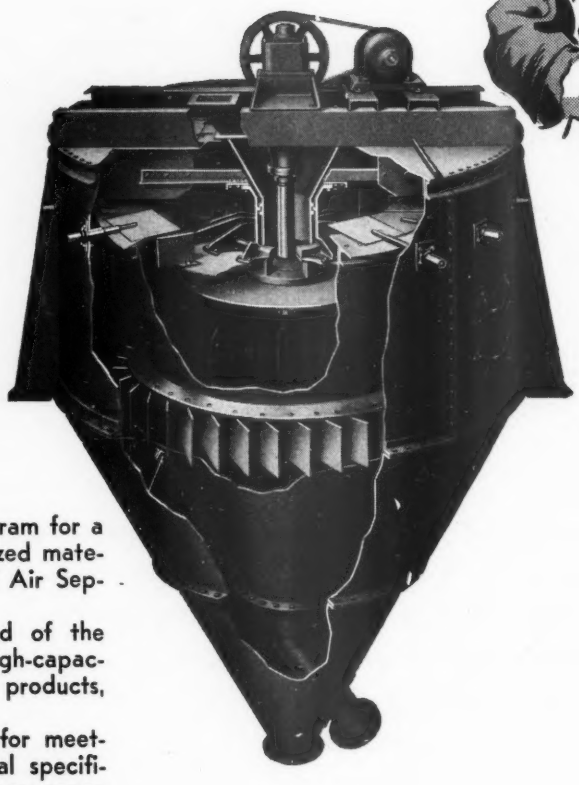
thew. Lorain

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

PASSWORD

in Fine Sizing

"Sturtevant!"



THE CHALLENGE of the war program for a vast expansion in supplying finely sized materials, is answered by STURTEVANT Air Separators.

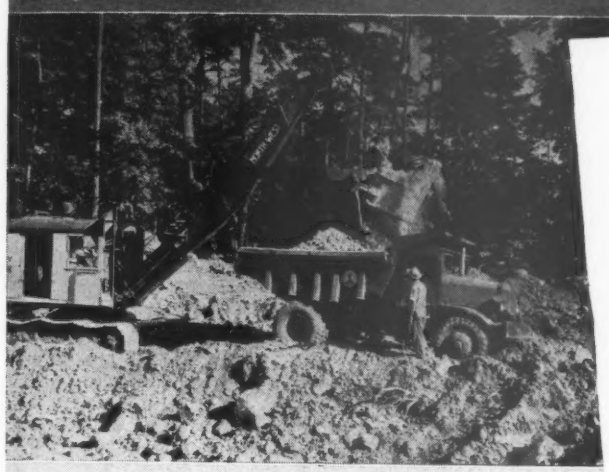
"STURTEVANTS" meet every need of the operator who requires continuous high-capacity output of accurately classified products, with costs held to a minimum.

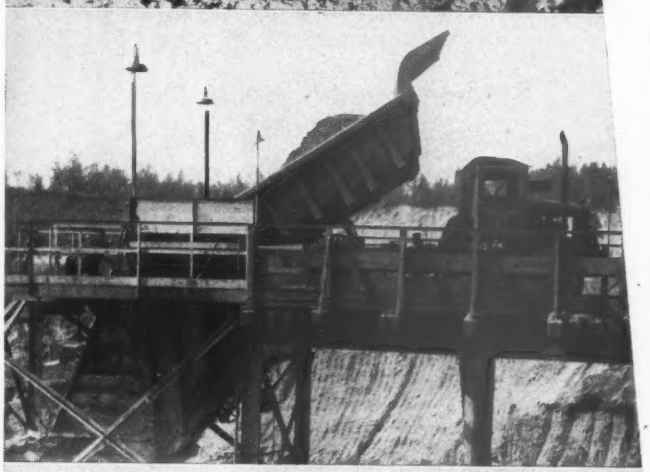
"STURTEVANTS" are dependable for meeting both government and industrial specifications because they provide a fineness range of 40-mesh to 350-mesh and micron sizes . . . perfectly controlled particle size and specific surface area . . . . lower mill temperatures . . . . larger mill output . . . maximum uniformity of material.

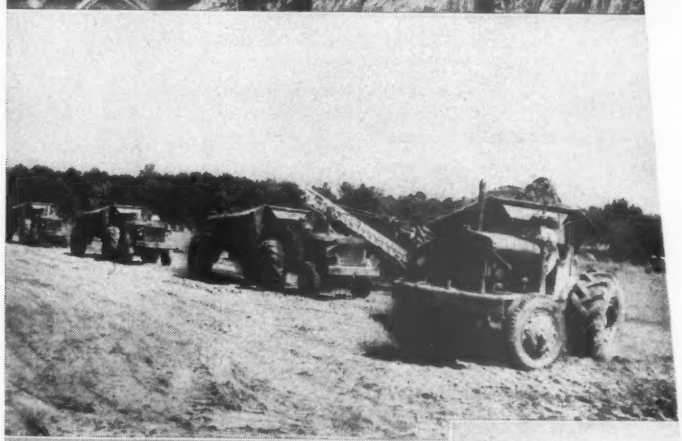
Write for Bulletins

Hundreds of STURTEVANT Air Separators are now in use in the cement industry alone. All were accepted on approval, none rejected.

STURTEVANT MILL CO. BOSTON, MASS.







HELP *for* "GREEN HANDS"

● The shortage of experienced maintenance men may mean more idle equipment time unless your "green hands" are given adequate instruction. Improper lubrication and the lack of regular servicing not only shortens the operating life of equipment, but results in breakdowns and loss of productive capacity that could be avoided.

If your lubrication men have not been provided with the information they need to properly care for Rear-Dump or Bottom-Dump EUCLIDS, write our Service Department for Lubrication Charts and Schedules. For Model F Rear-Dump EUCLIDS request Form INS-165; Bottom-Dump Euclid lubrication data is contained in Forms INS-162 and INS-172.

The EUCLID ROAD MACHINERY Co.
CLEVELAND **OHIO**

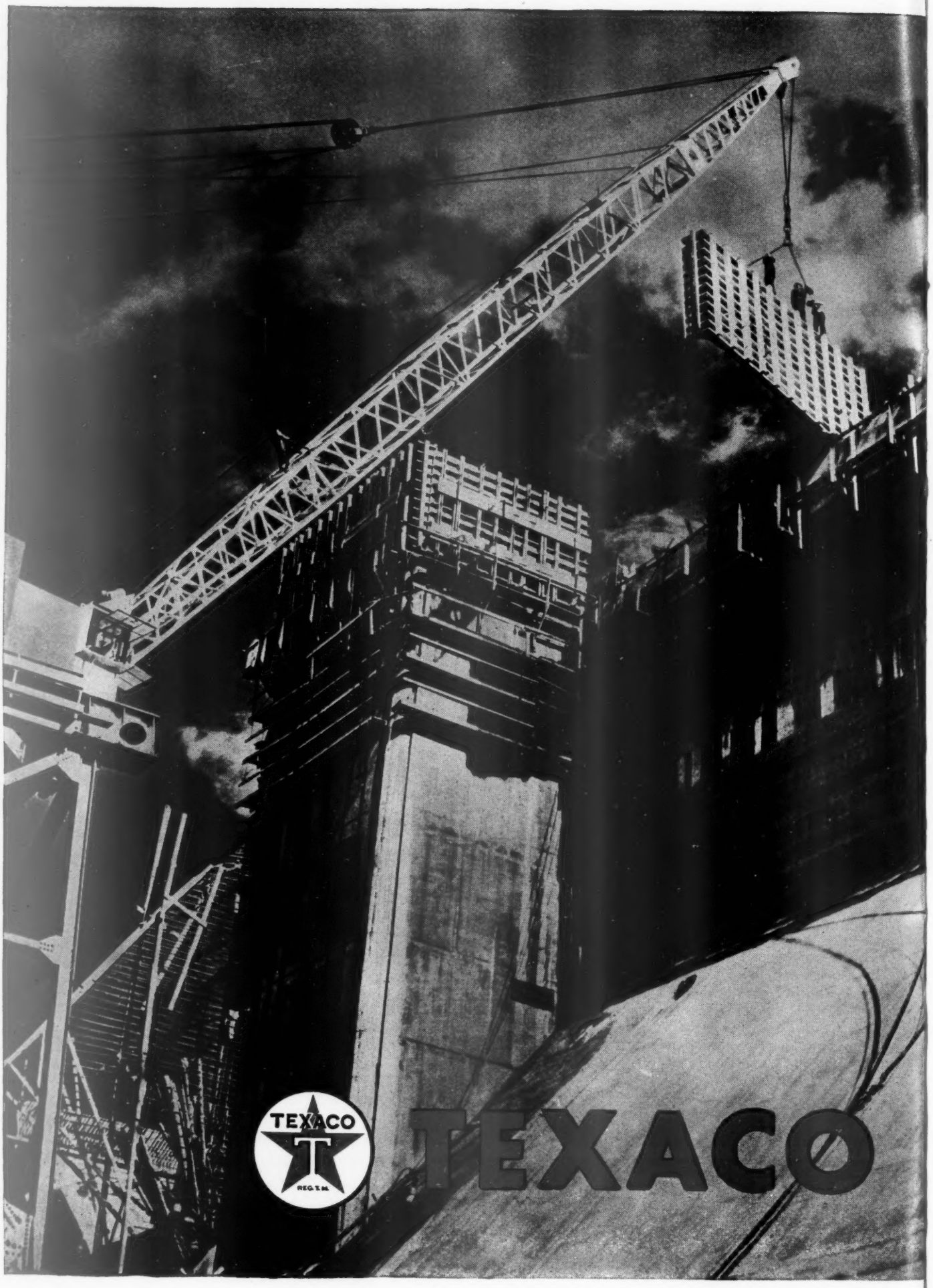
The loading view at the top of the page shows a Rear-Dump EUCLID on a Naval Training Base job. Other views down the page show a Euclid dumping iron ore into a hopper; part of a large fleet of Bottom-Dump EUCLIDS being loaded by an elevating grader at a southern air base; and grading work on a large air training field.

EUCLID

SELF-POWERED HAULING EQUIPMENT
For EARTH . . ROCK . . COAL . . ORE

CRAWLER WAGONS · ROTARY SCRAPERS · TAMPING ROLLERS

EUCLID THE PIONEER


TEXACO
REG. U.S. PAT. OFF.
TEXACO

PROTECT your Wire Ropes

SWINGING this huge concrete form into place typifies the vital importance of protecting wire ropes against excessive wear and corrosion.

Not only in the building of giant dams, but in all work involving the use of cranes, derricks, hoists, shovels, drag lines, etc., operators everywhere are protecting their wire rope by lubricating it with *Texaco Crater*.

Texaco Crater penetrates to the very core, sealing each wire in a tough, viscous film that reduces internal friction and wear, keeps out moisture, rust and corrosion.

So effective have Texaco lubricants proved in increasing output that they are definitely preferred in the several important fields listed at the right.

A Texaco Lubrication Engineer will gladly cooperate in the selection of the most suitable lubricants for your equipment. Just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ *More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.*

★ *More revenue airline miles in the U. S. are flown with Texaco than with any other brand.*

★ *More buses, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.*

★ *More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.*

★ *More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.*

CRATER

TUNE IN THE TEXACO STAR THEATRE
EVERY SUNDAY NIGHT—CBS

★

HELP WIN THE WAR BY
RETURNING EMPTY DRUMS PROMPTLY

BELTING AND HOSE WITH A THUMB

Man owes his handiness to his thumbs. It is the thumb that gives grip to the hand. It is the thumb that enables man to master and control physical activity.

The thumb represents the power and capability that sets man apart from other creatures—so we use it to symbolize the extra something that distinguishes Thermoid belting and hose and other industrial products.

The engineers and production experts who build Thermoid Industrial Products approach their work with a knowledge of end-use problems. Beyond their equations and specifications, these men see the millions of tons of material that will be carried on a conveyor belt . . . the miles of seams to be made with a length of welding hose.

The Thermoid name on industrial products is proof positive to everyone in your organization—from the President down—that the Purchasing Agent is giving Production and Maintenance the best that can be had.

P.S. In line with material conservation, Thermoid has prepared a series of bulletins on how to extend the life of rubber products now in use. You might find them helpful to be passed on as reminders to your operating people. Feel free to ask for copies.

THE THERMOID LINE INCLUDES: Transmission Belting • F.H.P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Sheet Packings • Industrial Brake Linings and Friction Products.

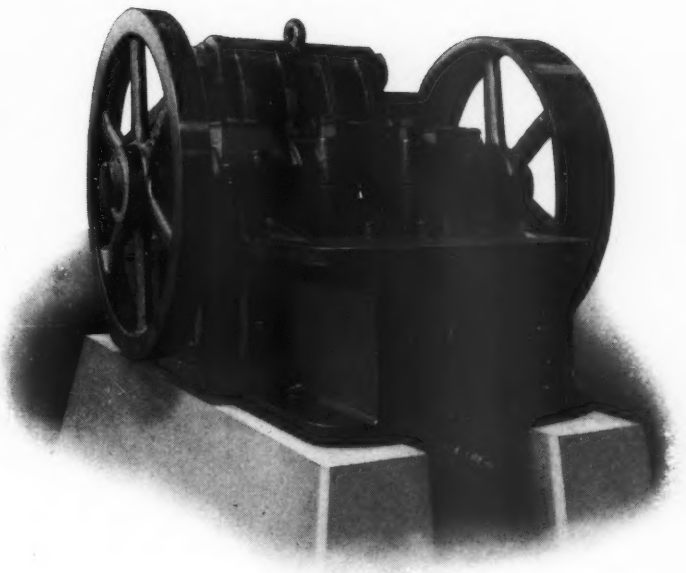
Thermoid Rubber

DIVISION OF THERMOID CO.
TRENTON, NEW JERSEY

IT'S GOOD BUSINESS TO DO BUSINESS WITH THERMOID

WELDED!

the FRAME is Better than a Steel Forging!



If it were possible, which of course it is not, to hammer out in a single piece, a steel frame for a Traylor Type H Blake Jaw Crusher, it would not be as good as one made by our method, because its shape is such that the forging process would set up strains that would inevitably weaken the unit in some parts.

You see, we use honest rolled steel plate, and when the pieces that compose the whole are welded in their proper places by our original scientific methods, a crusher frame is produced that is stronger and more dependable than could be made in any other way of any other material. No strains are set up, and the welded joints are so thoroughly fused as to be stronger than the parent metal. Literally, the assembled unit is in one piece, overwhelmingly strong, yet of lighter weight than could be attained in a casting.

The frame is not the only valuable feature of the Type H Crusher. A simplified and improved Swing Jaw Suspension saves power and wear, separate Pitman Shaft Bearings and CURVED JAW PLATES that employ the principle of the Bell Heads and Concaves that have made Traylor Reduction Crushers leaders in the field. The curved jaw plates enable FINER crushing at GREATER CAPACITY without increase of power used. Also, the wearing metal consumed per ton is minimum, and the product is more cubical and contains less waste fines, both because the curved jaw plates eliminate all choking.

The Type H Crusher is built in a wide range of sizes,—eight sizes from 8″ x 12″ to 30″ x 42″,—thus covering almost every ordinary requirement.

Investigate this machine closely, before you buy. Our representative will be glad to give you all of the "dope" in person, if you like. Write us.

WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

SEE BULLETIN 2105

TRAYLOR

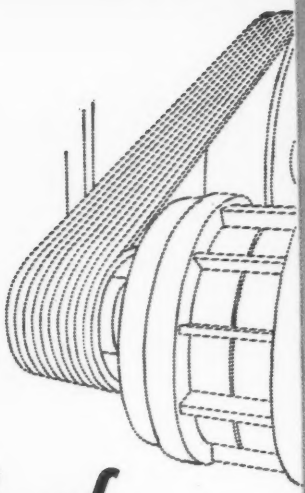
ENGINEERING & MANUFACTURING CO.

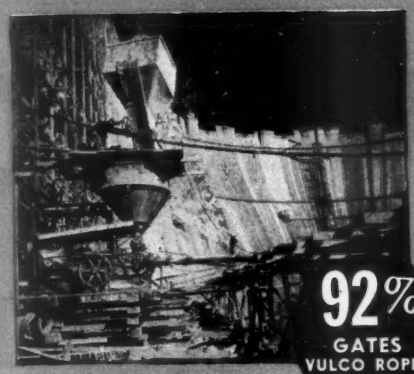
MAIN OFFICE AND WORKS — ALLENTOWN, PENNA., U.S.A.

NEW YORK CITY 3416 Empire State Bldg. | CHICAGO 2051 One La Salle St. Bldg. | SALT LAKE CITY 101 West Second South St. | LOS ANGELES 919 Chester Williams Bldg. | SPOKANE S. 2707 Rhyolite Rd.

B. C. EQUIPMENT CO., LTD.
551 Howe St., Vancouver, B. C.

Export Department — 104 Pearl St., New York City. Foreign Sales Agencies: London, Lima, Rio de Janeiro, Buenos Aires, Santiago, Antofagasta, Oruro, Montivideo.





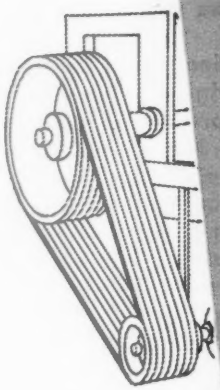
92% GATES VULCO ROPES

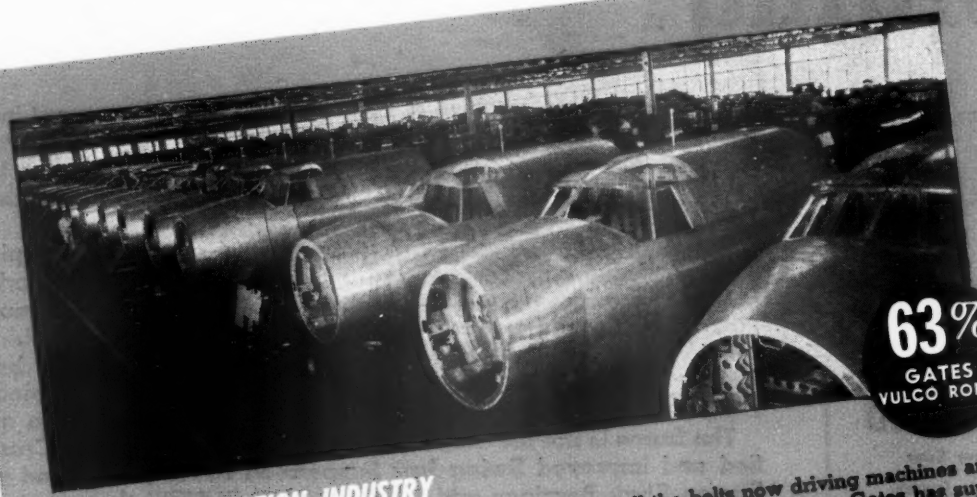
BOULDER DAM

Back in 1935 when Boulder Dam was still the biggest thing mankind had ever built, Gates Vulco Ropes were already first choice of America's leading Engineers. More than 92% of all V-belts used in building Boulder Dam were Gates Vulco Ropes.

Thousands of

GATES VULCO ROPES





63% GATES VULCO ROPES

AMERICAN AVIATION INDUSTRY

In 6 of America's largest aircraft-producing units, 63% of all the belts now driving machines are Gates Vulco Ropes. Where belts are subjected to severe heat and oil conditions, Gates has supplied the aviation industry with thousands of special heat and oil resisting belts. These belts, made of a special synthetic rubber, withstand severe heat and oil conditions twice to three times as long as V-belts made with natural rubber.

87% GATES VULCO ROPES

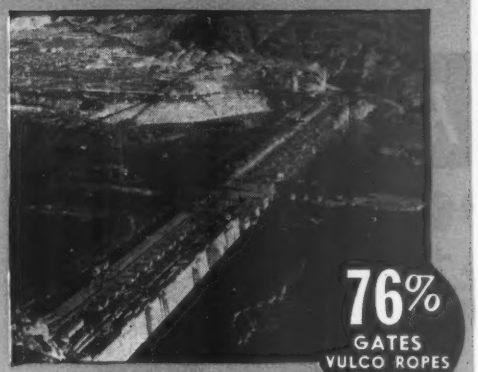
PENNSYLVANIA TURNPIKE

Built by 155 contractors from 18 different States—yet more than 87% of all the V-belts used were Gates Vulco Ropes.

94% GATES VULCO ROPES

GREAT CENTRAL VALLEY—California

In many ways the greatest project of all—and, here again, 94% of the V-belts selected were Gates Vulco Ropes.



GRAND COULEE

Gates began supplying industry with V-belts made entirely of synthetic rubber in 1938—just when the first big units of Grand Coulee were nearing completion. On this mammoth engineering project, Gates Vulco Ropes totaled more than 76% of all the V-belts used.

COLORADO RIVER AQUEDUCT

American Engineers once more gave Gates Vulco Ropes predominantly first place. To build 91 miles of tunnels, 60 miles of canals, 56 miles of conduit, 3 immense aggregate plants and a diversion dam 320 feet high, 85% of the V-belts chosen for the work were Gates Vulco Ropes.

---in America's Greatest Industrial Projects—

Have Been Made Entirely of

Synthetic Rubber

It is no accident that GATES — the World's Largest Maker of V-belts—began supplying industry with thousands of V-belts made entirely of synthetic rubber *5 years before* anyone could know that supplies of natural rubber would be cut off by war.

The Gates synthetic rubber V-belt—now thoroughly tested by *years*, not *months*, of service—was in no sense developed as merely a "substitute" for rubber. It was designed to be—and in certain important applications it has *proved* itself to be—greatly *superior* to belts of natural rubber.

There is this to be kept always in mind concerning rubber:—A tree can make only one kind. In synthetic rubbers we have the choice of *many* kinds. Gates uses each kind where it best meets some particular service need.

In the Gates Special Heat and Oil Belt, for instance, a *very special kind* of synthetic rubber is used. This special synthetic rubber has the ability to withstand heat and oil much better than natural rubber can.

You know, of course, from every day experience, that your Standard Gates Vulco Ropes withstand exposure to heat and oil very well. It is when the heat or oil conditions become *excessively* severe that the Gates *special* synthetic V-belt, at a little higher price, has proved its ability to give *very much longer* wear than any other V-belt you can use.

Beyond any question, Gates has had *longer* experience and *more successful* experience in the fabrication of synthetic rubber V-belts than *any other* manufacturer.

To know of this will be to your advantage —particularly NOW when Gates' unequaled experience in making synthetic rubber V-belts can be put to use right in your own plant. You have only to look in your telephone directory and call the Gates Field Engineer. He will put at your service the full benefits of Gates' knowledge and experience *without the slightest obligation*.

THE GATES RUBBER COMPANY

439

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

CHICAGO, ILL. 549 West Washington
NEW YORK CITY 215-219 Fourth Avenue
ATLANTA, GA. 738 C. & S. National Bank Building
LOS ANGELES, CAL. 2240 East Washington Boulevard
DENVER, COLO. 999 South Broadway
DALLAS, TEXAS 2213 Griffin Street
PORTLAND, ORE. 333 N. W. 5th Avenue
SAN FRANCISCO, CAL. 1090 Bryant Street

The Care and Maintenance of Rock Crushers

Ten Time and Money-Saving Maintenance Rules:

No. 5 of a series of advertisements published in the interests of national economy and to aid those users of crushing equipment unable to secure new units during the emergency.

1. Be sure there is no play in side bearings. Tighten locking nuts with a blunt chisel and hammer, as illustrated.

2. Before shutting off power, be sure that machinery is cleaned of all stone or gravel.

3. Keep your equipment clean and free of dirt and excess grease.

4. Tighten all loose nuts and bolts every morning or every night, and check them periodically during the day. Make a thorough check after moving to a new location. Loose parts cause rapid wear or serious breakage and costly delays.

5. Crusher and chassis should always be kept level

6. The key wedge should be kept close to the jaw. Insert shims behind wedge if necessary. Check wedge daily to be sure that it is tight; and that movable jaw remains centered.

7. Always adjust movable jaws when crusher is running empty, until they touch lightly. Then back them off slightly for clearance. Never allow them to pound. Tension spring should be just loose enough to allow free operation.

8. Don't raise or lower the adjusting wedge enough to cause a tilting in the toggle plate bearing wedge. Use a longer or shorter toggle to get the desired opening at the discharge opening of the jaws.

9. Be sure toggle seat on pitman is tight.

10. Be sure to use genuine parts—and see that they are properly installed. Follow instruction sheets or consult manufacturer.

UNIVERSAL ENGINEERING CORP.

Formerly Universal Crusher Co.

619 C Ave. West **Cedar Rapids, Iowa**

They're giving their lives—
let's lend our money!

"*WITH* Gulf Products our trucks deliver **dependable service 12 hours a day,**"

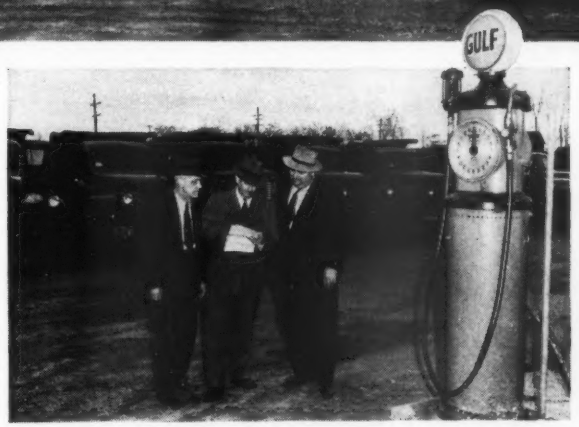
says hauling contractor for war projects

"Proper Lubrication and efficient fuel performance keep our equipment continuously on the move at low cost"

Today the care and maintenance of large truck fleets, such as the one operated by William A. Harting of Lansdowne, Maryland, is no easy task. It demands exacting attention to every detail—one of the most important of which is the use of proper lubricants and fuels.

Construction men have found through experience that the use of high quality petroleum products is the surest guarantee of efficient operation and the best insurance against breakdowns or mechanical failures. That is why so many contractors engaged in vital war construction work today are turning to Gulf Quality Products.

In addition to their high quality, there are three additional advantages in using Gulf products: first, an experienced Gulf engineer recommends, on the job, the proper types and grades for each requirement; second, you're sure of getting lubricants exactly suited to your equipment and to your operating conditions



William A. Harting, contractor of Lansdowne, Maryland, is engaged in hauling under sub-contract for many firms doing war-construction work in Maryland. He has just completed hauling for a large airport, and is now building defense highways leading to several Naval and Air bases. His fleet consists of 65 trucks of 3½- to 5-ton capacity with an average load of 4 cubic yards. He is shown above conferring with a Gulf Service Engineer.

—for the Gulf line includes over 400 quality oils and greases; third, Gulf's wide distribution through more than 1200 warehouses, located throughout 30 states from Maine to New Mexico, insures prompt delivery.

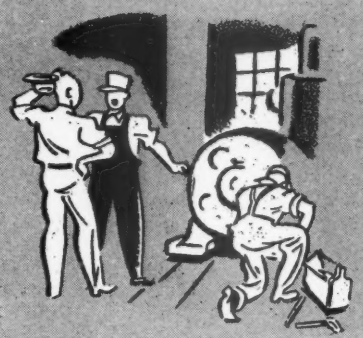
Write or phone Gulf now, and arrange to use Gulf higher quality lubricants and fuels on your next job. They will help you complete it more quickly and at a larger profit.

GULF OIL CORPORATION · GULF REFINING COMPANY, PITTSBURGH, PA.

☑ Check Your

Here are 5 of the most dangerous bottlenecks threatening U.S. Processors today. Check yours — then note how much help you can get from Allis-Chalmers Cooperative Engineering to crack them wide open!

☐ **Unexpected Breakdowns?**



How many of your key machines were built for 24-hour-day service?

☐ **Lagging Schedules?**

Maybe you have a bottleneck — an added machine would load up all units.

WHICHEVER THEY ARE— CALL ON ALLIS-

Teamwork! When you specify Allis-Chalmers, our engineers work closely with your staff!

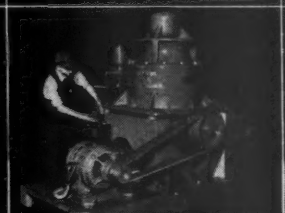
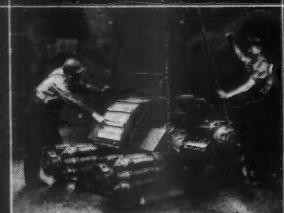
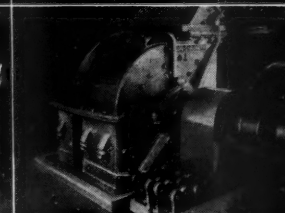
IT'S PLENTY TOUGH to crack bottlenecks today . . . but remember there's *one* company that *specializes* in helping you do it — Allis-Chalmers!

Here's an organization that builds *all types* of basic processing equipment . . . in the full line highlighted below.

Because it's the business of Allis-Chalmers engineers to know *all phases* of basic processing, they know ways to make units of *existing equipment* "team up" better . . . to give you immediately increased war production.

Another important plus that comes from building *all* types of equipment: Allis-Chalmers engineers are *not* forced to

Only Allis-Chalmers Makes a Complete Line of this Equipment!

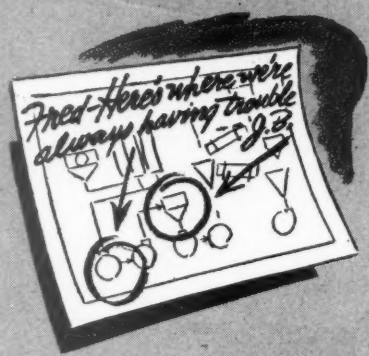
Jaw Crushers	Gyratory Crushers	Crushing Rolls	Pulverators
			
All-steel primary and fine reduction. ¼"-12" product.	High-speed primary and secondary. 3" to 60" size feed.	6 different types. Reduction ratios from 5-1 to 10-1.	"Multi-impact" reduces non-abrasives to cubical shape.

Bottlenecks!

☐ Labor Shortage?

Do you use any men unnecessarily? Processing is a *machine* industry!

☐ Obsolete Machinery?



Some machines that used to "get by" need too much maintenance today.

☐ Overworked Engineers?

Outside engineering cooperation might solve many problems quickly.

CHALMERS!

recommend some *one* type. *What you need* dictates their recommendations, *not what they've got!*

If you have a bottleneck to break, Allis-Chalmers Cooperative Engineering is ready to help. Call your nearby district office. Or write ALLIS-CHALMERS, MILWAUKEE, WISCONSIN.

A-1578A

Models of processing machinery in Allis-Chalmers laboratories reproduce conditions in your plant — help eliminate guesswork!

Blade Mills	Vibrating Screens	Log & Sand Washers	Motors & Drives	Centrifugal Pumps
For washing and disintegration of materials up to 12".	Efficient separation and dewatering — 8 different types.	All-welded modern units for materials up to 3½" size.	Unbeatable team — Lo-Maintenance Motor & Texrope V-belts.	Largest line, highest efficiencies — built with motors.

Your Terms . . .

Unconditional Defiance

YOU and your fighting brothers of Yugoslavia made terms with the Axis . . . your terms . . . Unconditional Defiance. And from mountain strongholds, your battalions continue to fight back on those terms.

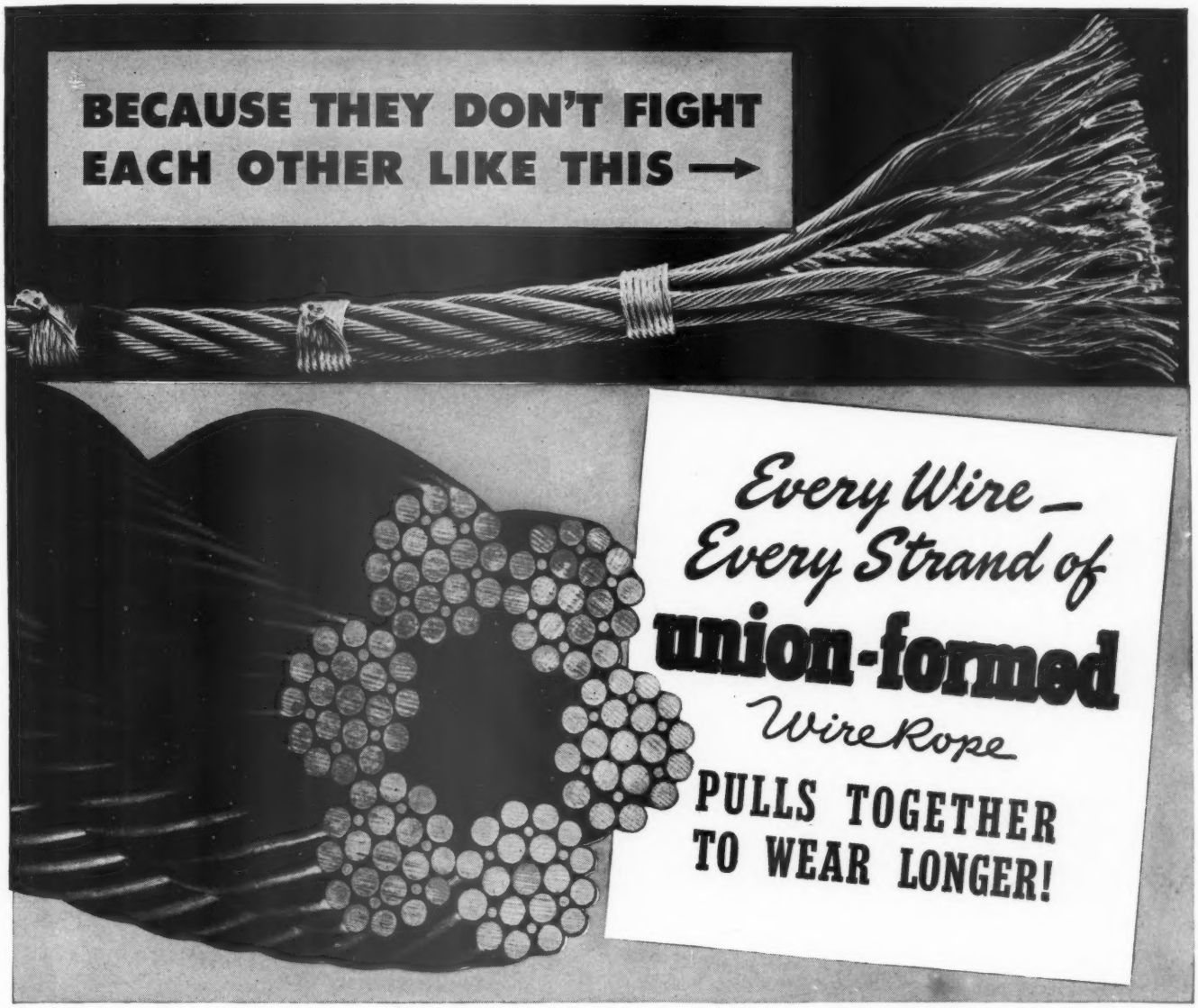
Your active patriotism is inspiring—and, in answer, we and our allies are drawing closer. Our bombs are beating down on our common enemy. Our armies are advancing by land, sea and air to break through and join you in Victory.

The road that leads to freedom has its beginning deep in the earth—in mines, in pits and quarries. Basic war material—blasted loose by mining men and started on its way to the war front—arrives there as fighting machines. And to make this basic material available to manufacture, our Company provides the miners with dependable, useful products —Ensign-Bickford Safety Fuse and Primacord-Bickford Detonating Fuse. With mining men and fighting men, we share the will toward Victory—and *Victory Begins Underground!*

THE ENSIGN-BICKFORD COMPANY
SIMSBURY, CONNECTICUT

I-P

Primacord-Bickford
Detonating Fuse



These two kinds of wire rope are made in our factory of the same special analysis high carbon steel, the same carefully controlled heat treatment and continuous wire drawing process. As made by our skilled craftsmen both give you plus value.

Yet there is a difference which means money-in-your-pocket. It is this: In ordinary wire rope of any make, the wires are "laid" into position without first being relieved of stresses set up through changing wires from straight to helical or spiraling shapes. Under these unresolved stresses, the wires have a strong tendency to fight each other and will fly apart when the seizing wire is removed. This wasted effort cuts down the resistance to bending fatigue of the rope as a whole.

In *Union-formed* wire rope, the method of helical or spiral shaping the wires in it before they become component parts, entirely frees the rope of shaping stresses. Thus preformed, parts lay in their positions in such perfect repose that they will not fly apart—in fact, often must be pried from position. *Union-formed* wire rope, therefore, utilizes its full stamina for maximum resistance to bending fatigue. That is why *Union-formed* wire rope bends more easily. Every wire and every strand pulls together to wear longer.

This is only one of 10 time-saving, money-in-your-pocket advantages of *Union-formed* wire rope. To the limit permitted under conditions of war, Union is striving to satisfy urgent needs outside of war production.

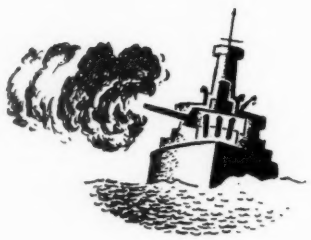
UNION WIRE ROPE CORPORATION
2132 Manchester Ave., KANSAS CITY, MO.
Tulsa • Houston • Chicago • Salt Lake City • New Orleans
Monahans, Texas • Portland • Ashland, Ky. • Atlanta

IF YOU ARE NOT ON OUR MAILING LIST send for these bulletins: "ROPE DOPE," "Socketing Wire Rope," "Splicing Wire Rope," "Correct Handling of Wire Rope," and "Wire Rope Lubrication." Engineering information supplied without obligation. G-43

UNION WIRE ROPE CORP.
union *Wire Rope*
"THE ULTIMATE IN LOW COST WIRE ROPE"

THREE TIMES WON
FOR EXCELLENCE IN
WAR PRODUCTION

WHEN YOU NEED PREFORMED WIRE ROPE
SPECIFY **union-formed**



A taut steel rope angles down into the boiling wake, so small in proportion to the vessel that it seems like a fishing line over the stern of a rowboat.

Far off over the rim of the horizon, there's a flicker of light followed by a sound like distant thunder. The steel rope jerks as if some huge sea monster were nibbling at it.

The steel line is not for fishing. It's a target-towing hawser. The distant thunder comes from the big guns of a battleship. The "nibbling" is the impact of heavy shells upon the target.

Naval target-towing hawser is one of the many special war ropes now being produced by Bethlehem Steel Company. Because of its great length, this rope must be light yet incredibly strong. It must also resist corrosion by sea water. To solve this particular problem, Bethlehem developed steel rope wire with very high strength and shock resistance. This wire is coated by the exclusive bethanizing process. Bethanizing is an electrolytic coating process which produces the purest, tightest, most uniform zinc armor ever applied to rope wire, and yet does not reduce the toughness or fatigue-resistance of the wire.

Every foot of wire rope made by Bethlehem is helping in some way to win the war. We're working 168 hours a week to supply the battlefronts and yet not neglect the mines, quarries, mills, factories and dozens of other "musts" at home.

BETHLEHEM STEEL

REMODELING THE MAP with Cedarapids

Built by IOWA

ALASKA

IDAHO

OREGON

ARIZONA

CALIFORNIA

MEXICO

Proved from ALASKA to MEXICO by MORRISON-KNUDSEN CO.

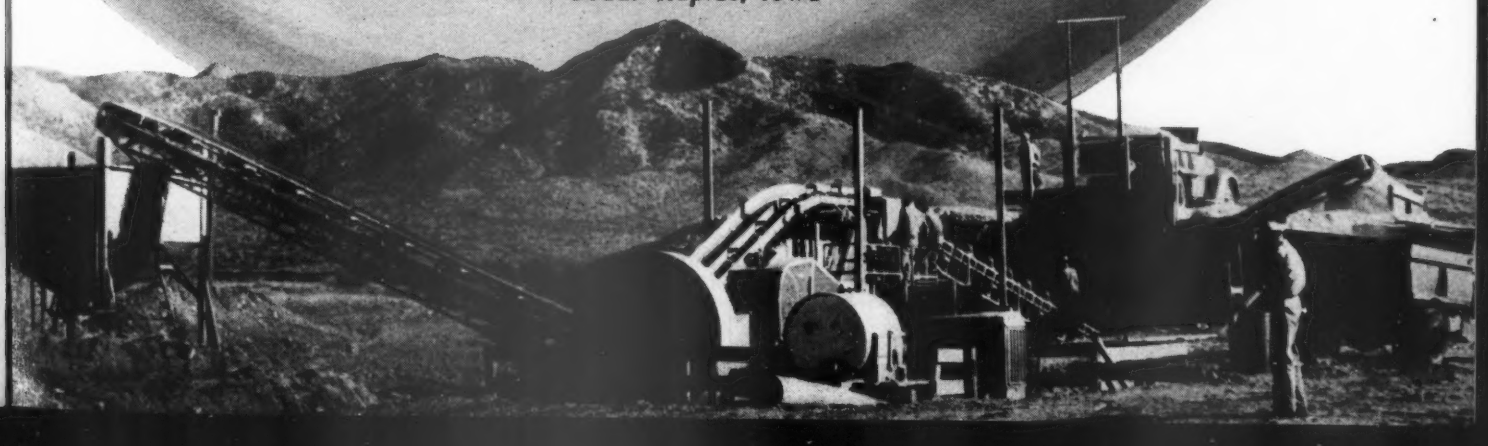
DOWN America's long Pacific Coast Line the map is changing. War Birds Nests—landing fields that were never there before mark strategic locations for America's protection.

War time construction is high pressure construction — the toughest possible test on man and machine. It is significant that Morrison-Knudsen of Boise, Idaho, a firm that bases its purchase of machinery on the job to be done, has bought Cedarapids Portable Crushing Plants again and again. From far flung Alaska to the plains of Mexico Morrison-Knudsen has been building war birds nests with Cedarapids plants. And Morrison-Knudsen is just one of the many well-known outfits that have been getting big output out of Cedarapids plants and who have bought more than one Cedarapids portable crushing plant.

Remember a repeat order buyer is a satisfied buyer. Tomorrow when peace makes the advancement and expansion of your own business possible, remember that Iowa Cedarapids plants are both war and peace time tested by the Nation's leading contractors. Come to Headquarters for aggregate producing equipment.

IOWA MANUFACTURING COMPANY

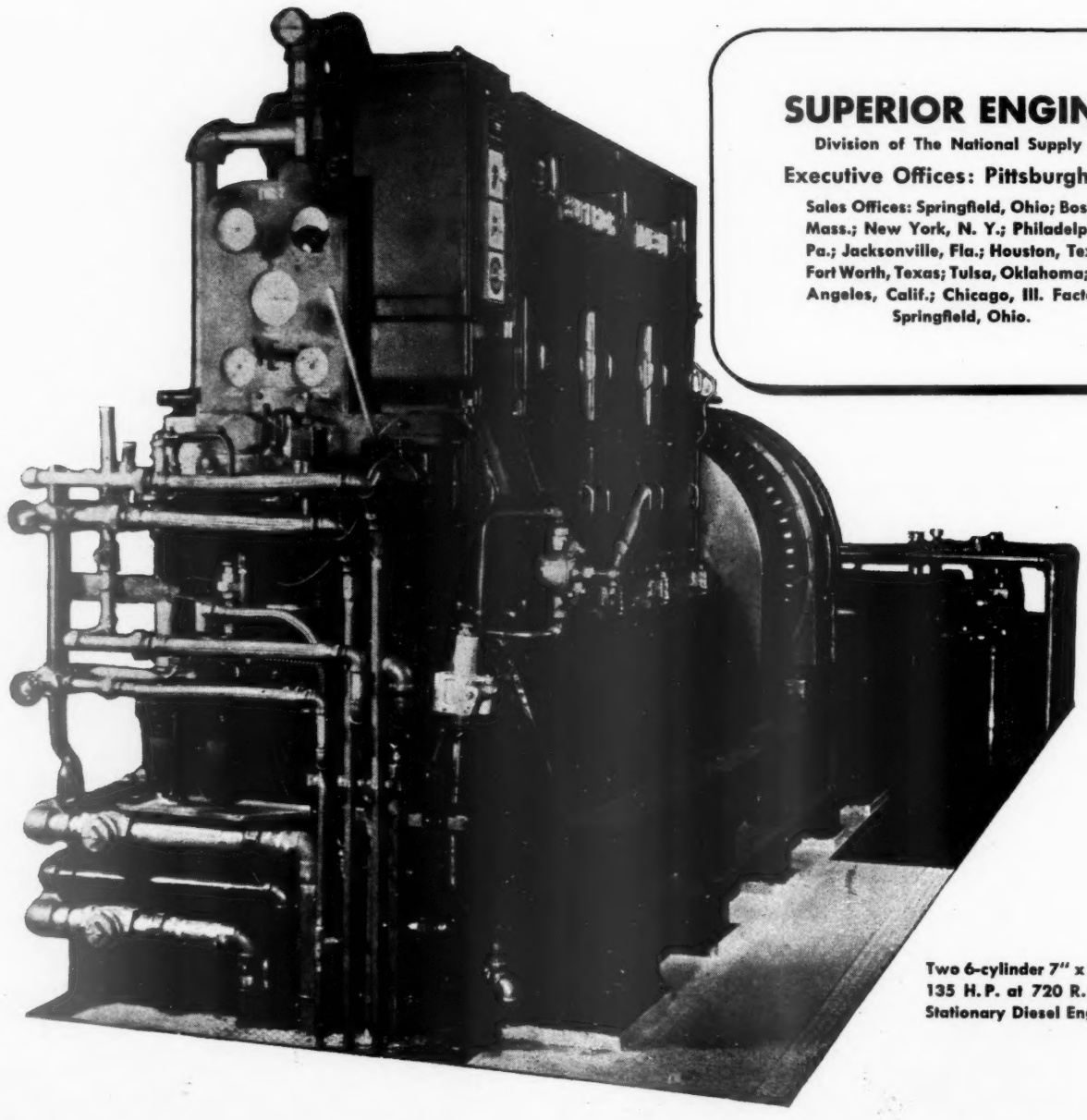
Cedar Rapids, Iowa



Vital American Industry chooses *Superior* DIESELS

ONE of America's largest companies, with branches from coast to coast, has installed proven Superior Diesels to be used as standby power.

This company's business is of such a critical nature that power failure, even for an hour, would be a serious hindrance to our war effort. Their choice of Superior Stationary Diesels for standby power is another very real tribute to the quality, economy and absolute dependability of this great engine.



SUPERIOR ENGINES

Division of The National Supply Co.

Executive Offices: Pittsburgh, Pa.

Sales Offices: Springfield, Ohio; Boston, Mass.; New York, N. Y.; Philadelphia, Pa.; Jacksonville, Fla.; Houston, Texas; Fort Worth, Texas; Tulsa, Oklahoma; Los Angeles, Calif.; Chicago, Ill. Factory: Springfield, Ohio.

Two 6-cylinder 7" x 9"—
135 H. P. at 720 R. P. M.
Stationary Diesel Engines

A pair of pants is not as hard to replace as vital motor parts—but in either case, you're more interested in protection than in replacement. Macmillan RING-FREE Motor Oil *protects* pistons... rings... valves... bearings because it reduces friction faster!

Reduced fuel consumption is proof of friction Reduction!

If friction is reduced, more horsepower is released to the drive-shaft—and this extra horsepower should be measureable in reduced fuel consumption. *Compare RING-FREE with *any* other motor oil on that basis under similar conditions!

RING-FREE removes carbon

Carbon removal is a natural RING-FREE function, inherent in the crude oil and retained by the exclusive Macmillan patented process. RING-FREE removes carbon while the motor runs!

In 1094 certified road tests, with various makes of owner-driven cars, the average *immediate* saving of gasoline was 1.3 miles per gallon after crankcases were drained and refilled with RING-FREE. In many types of Diesel operations, as much as 25% reduction in operating costs (including maintenance and fuel) are reported. At the same time, oil consumption is reported decreased!

Macmillan RING-FREE Motor Oil combines all these qualities: 1—Removes Carbon, 2—Reduces Friction *Fast*, 3—Saves Fuel, 4—Has Great Film Strength, 5—Has High Heat Resistance, 6—Long Cling to Metal, 7—Fast Penetration, 8—Is Non-Corrosive, 9—Is Less Affected by Dilution.

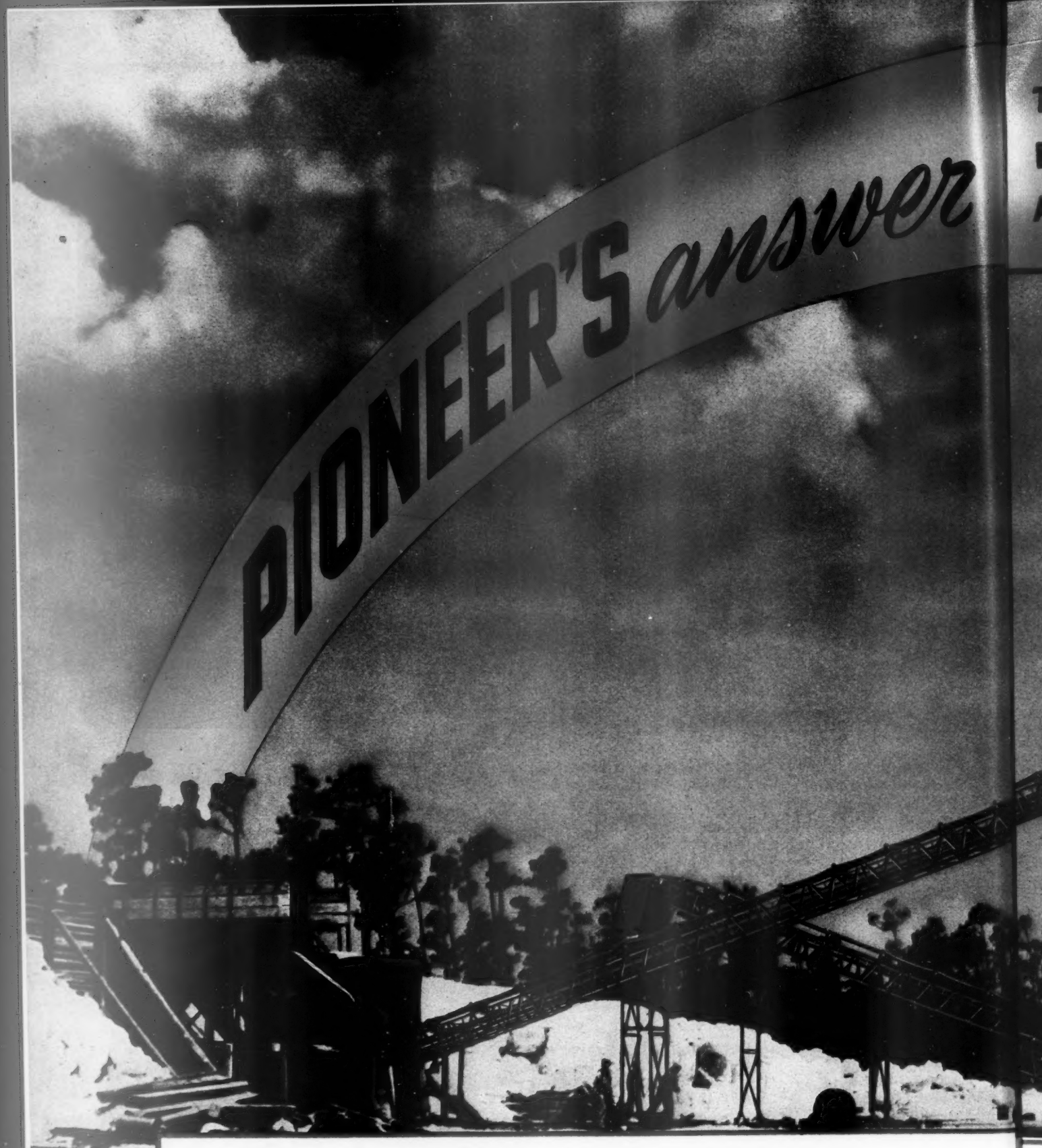
Macmillan Petroleum Corp.

50 W. 50th, New York • 624 S. Michigan Ave., Chicago • 530 W. 6th, Los Angeles

Copyright 1943 Macmillan Petroleum Corp.

MACMILLAN
RING-FREE
MOTOR OIL

REDUCES WEAR BY REDUCING FRICTION



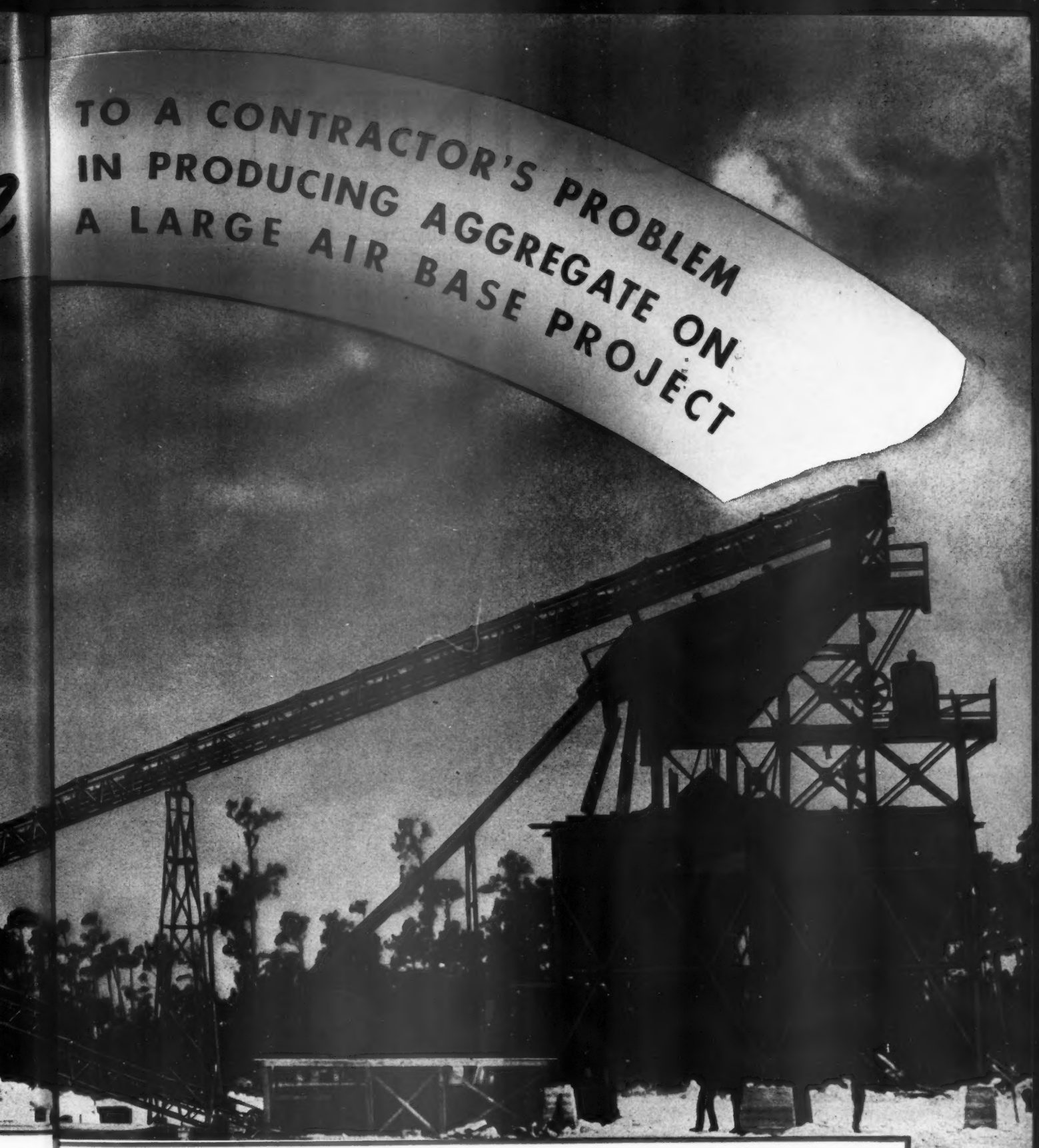
One of the big problems on the big airbase jobs these days is to produce sufficient quantities of suitable aggregates. Concrete construction requires sized, crushed, and washed aggregate. Bituminous surfacing materials should be crushed and sized.

In most cases, there is little choice of materials. It is necessary that the aggregate plant be capable of processing any available materials so they are suitable for the job.

Here is Pioneer's answer. A semi-portable plant that is complete with steel bins and conveyors, both designed to be knocked down for moving.

The plant consists of a traveling grizzly feeder—a 30"x 42" primary jaw crusher—a 54"x24" secondary roll crusher—a 40"x22" final roll crusher—a 4'x16' vibrating screen—four steel storage bins—washing equipment—lattice frame belt conveyors and Diesel power.

The complete plant was designed by Pioneer Engineers —factory built and shipped complete with all necessary



drives, spouting, and everything except the foundation

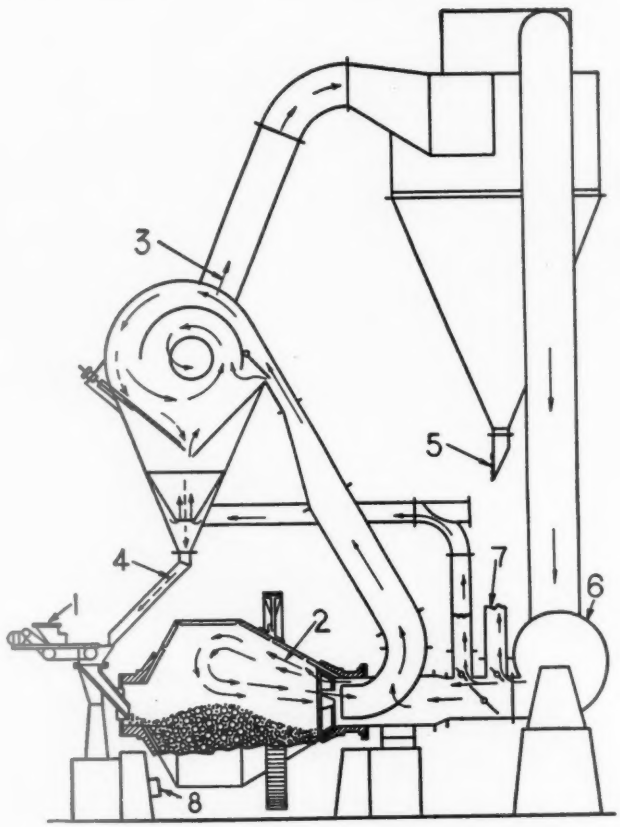
One manufacturer is responsible for all the equipment. It is a balanced plant, without a bottleneck. It is easy and quick to set up as soon as it arrives on the job.

This plant will operate in quarry rock or gravel and it will produce clean, graded, crushed aggregate. If necessary, it will produce sand from quarry rock.

Maybe Pioneer can answer your problem too.

Pioneer
ENGINEERING WORKS
Minneapolis, Minnesota, U. S. A.

DRY GRINDING



Arrangement of Conical Mill and Loop Classifier

1. Material fed to mill by constant weight Feeder.
2. Finished material removed from mill as soon as produced.
3. Separations: 20 mesh to as fine as 99.9% minus 325 mesh.
4. Oversize returned to feed end of mill.
5. Product discharged at any elevation—no elevator required.
6. Fan returns clean air to mill.
7. Small amount of air and vapor vented.
8. "Electric Ear" Sound Control Unit maintains maximum capacity.

The reduction of many materials frequently can be done most economically in the dry state. Typical is a recent installation of 10 ft. diameter Hardinge Mills with air classifiers and air heaters reducing a manganese ore containing up to 15% moisture to a dried product passing 48 mesh.

The Hardinge Company, Inc. has designed and installed dry grinding Ball and Pebble Mills equipped with air classifiers for many years. We have a wide experience in the grinding and classifying of hard and abrasive materials.

Bulletin 13-D describing the Hardinge Conical Mills will be sent upon request.

HARDINGE EQUIPMENT

	Bulletin No.
Agitators	31-C
Clarifiers	31-C
Classifiers, Air	17-B
Classifiers, Counter-Current	39-A
Classifiers, Hydro	31-C
Density Stabilizer	42
Digesters	36
Dryers	16-C
"Electric Ear"	42
Feeders, Belt	33-C
Feeders, Constant Weight	33-C
Feeders, Disc	33-C
Feeders, Drum	33-C
Feeders, Non-Flooding	33-C
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Filters, Sand	30-A
Metal Reclamation	8
Mills, Batch	19-A
Mills, Conical Ball	13-D
Mills, Conical Pebble	13-D
Mills, Rod	25-A
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Scrubbers, Conical	37
"Thermomill"	17-B
Thickeners	31-C

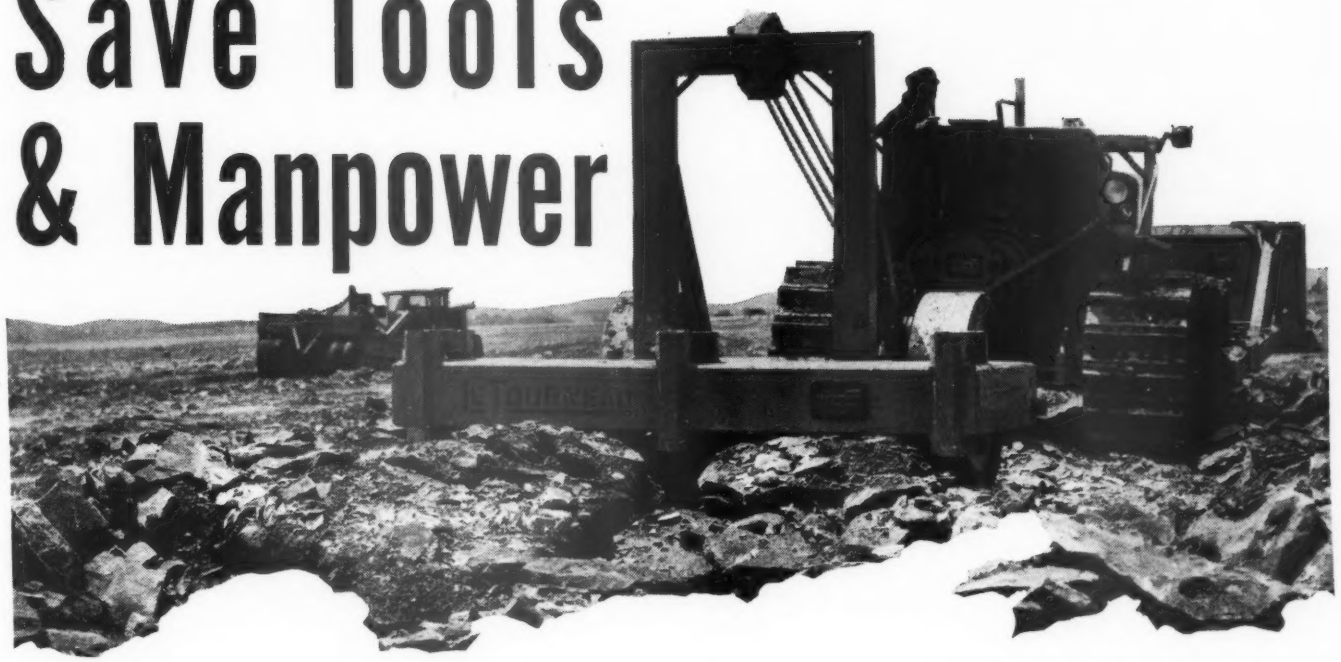
HARDINGE

COMPANY, INCORPORATED - YORK, PENNSYLVANIA

122 East 42nd Street, New York, N. Y.
205 West Wacker Drive, Chicago, Illinois
501 Howard Street, San Francisco, California
200 Bay St., Toronto, Ontario, Canada

How a LeTourneau Rooter Can Help You

Save Tools & Manpower



These Simple Rooter Methods Will Help You Strip More Yardage Faster with Fewer Men and Machines at Lower Costs

You can increase the stripping efficiency of your tractor-operated LeTourneau Dozers and Carryall Scrapers by first breaking up all hard materials — shale, hardpan, sunbaked clay or frozen ground— with a LeTourneau Rooter. By using a Rooter you speed rate of overburden removal and cut down maintenance on your tractors and other tractor tools. On most stripping jobs in tough, rocky material, Rooting also eliminates the need for shovels, compressors and drills and gives better fragmentation for Scraper loading than does blasting. It's safer . . . faster . . . and far cheaper. Thus, you save on both manpower and tools.

Built to Work On Your Dozer Tractor

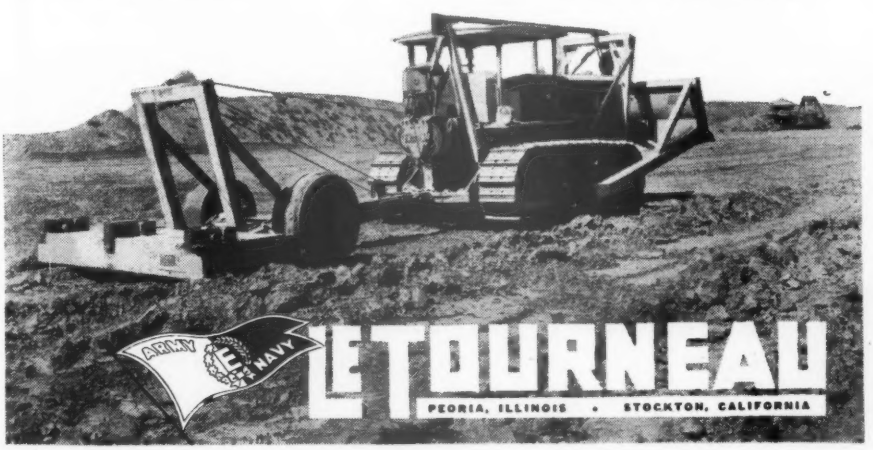
Both LeTourneau Rooter and Dozer are single-cable operated . . . can be combined on standard rear-mounted 2-drum Power Control Unit . . . to Root and Doze over short hauls with one tractor, or for pusher loading Rooted materials into Carryall Scrapers. Your tractor operator easily handles both tools . . . neither interferes with the operation of the other.

Quickly Interchangeable

Rooter is easily dropped to free tractor for LeTourneau Carryall Scraper, Crane and other drawbar work . . . thus, further increases the usefulness of your tractor.

(Above) Using center tooth only, rugged Heavy Duty Rooter takes full pull of "Caterpillar" D8 to break up hard shale for Scraper loading. Note veteran Carryall in background. Material like this used to be truck and shovel work.

With more than 2,000 rugged LeTourneau Rooters now in use by successful pit and quarry operators, miners, contractors and loggers all over the world . . . these job-proved methods are sure to give you lower cost stripping efficiency . . . same time, help lick the man and machine shortage problem. Put these work-increasing Rooter methods to use NOW. And for your parts and repair service . . . keep in touch with your LeTourneau-"Caterpillar" dealer. He is equipped to keep your tractors and LeTourneau stripping equipment working at full efficiency for Victory.



(Left) This smart California stripping outfit saved the need for a second tractor by combining operation of its LeTourneau Heavy Duty Rooter with Bulldozer . . . and at the same time, practically doubled the usefulness of its "Caterpillar" D7 tractor. The job —breaking up hard, sun-baked clay for easy stripping of underlying gravel deposits.

Manufacturers of DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNAROPE*, TOURNATRAILERS*, TOURNAWELD*, TRACTOR CRANES.

*Trade Mark Reg. U. S. Pat. Off.

It's bad when this pair gets together—

WE referred sometime ago in these columns to "Miss Application of the old school"—cited, as an example of her school of thought, the frequent use of pipe heavier than needed for the ordinary run of low or moderate pressure services.

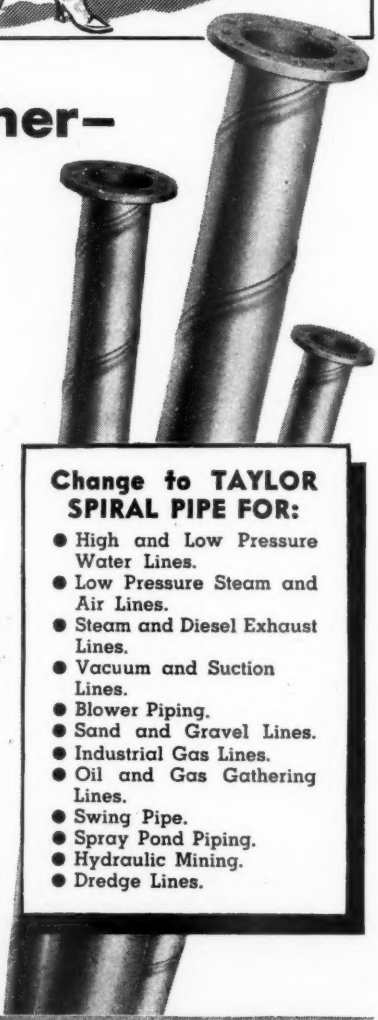
Not long ago another character, "Al", came along—full name: Allocation. Al has an essential job to perform in war industry, and it isn't right for his job to be all messed up by Miss Application.

Yet it's easy to see how this can happen — how carefully allocated materials can be wasted by their misapplication in this field. And conversely it's easy to see that, in the case of pipe, most efficient use of available steel is made when the pipe is "just right" for the job it has to handle.

Taylor Spiral Pipe has saved and will continue to save countless tons of vital steel. It has saved countless dollars, too; for the installed cost is low—often no more than half that of the heavier pipe it so well replaces.

Listed opposite are just a few of the many services that can be handled, adequately, with strength and service life to spare, by this light-but-rugged pipe. The chances are that it would find a lot of applications in your plant, too.

Switching to Taylor spiral for services like those listed is made practical by the range of sizes and variety of fittings. Thicknesses range from 18 to 6 gauge; joint lengths to 40 ft. All types of end joints, all kinds of fittings and "specials" or fabricated assemblies are produced, providing a complete service with undivided responsibility. Why not consider it for that next job.



Change to TAYLOR SPIRAL PIPE FOR:

- High and Low Pressure Water Lines.
- Low Pressure Steam and Air Lines.
- Steam and Diesel Exhaust Lines.
- Vacuum and Suction Lines.
- Blower Piping.
- Sand and Gravel Lines.
- Industrial Gas Lines.
- Oil and Gas Gathering Lines.
- Swing Pipe.
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Applying Compressed Air for countless jobs is one of Ingersoll-Rand's major contributions for the industries of war and peace.

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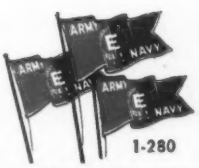
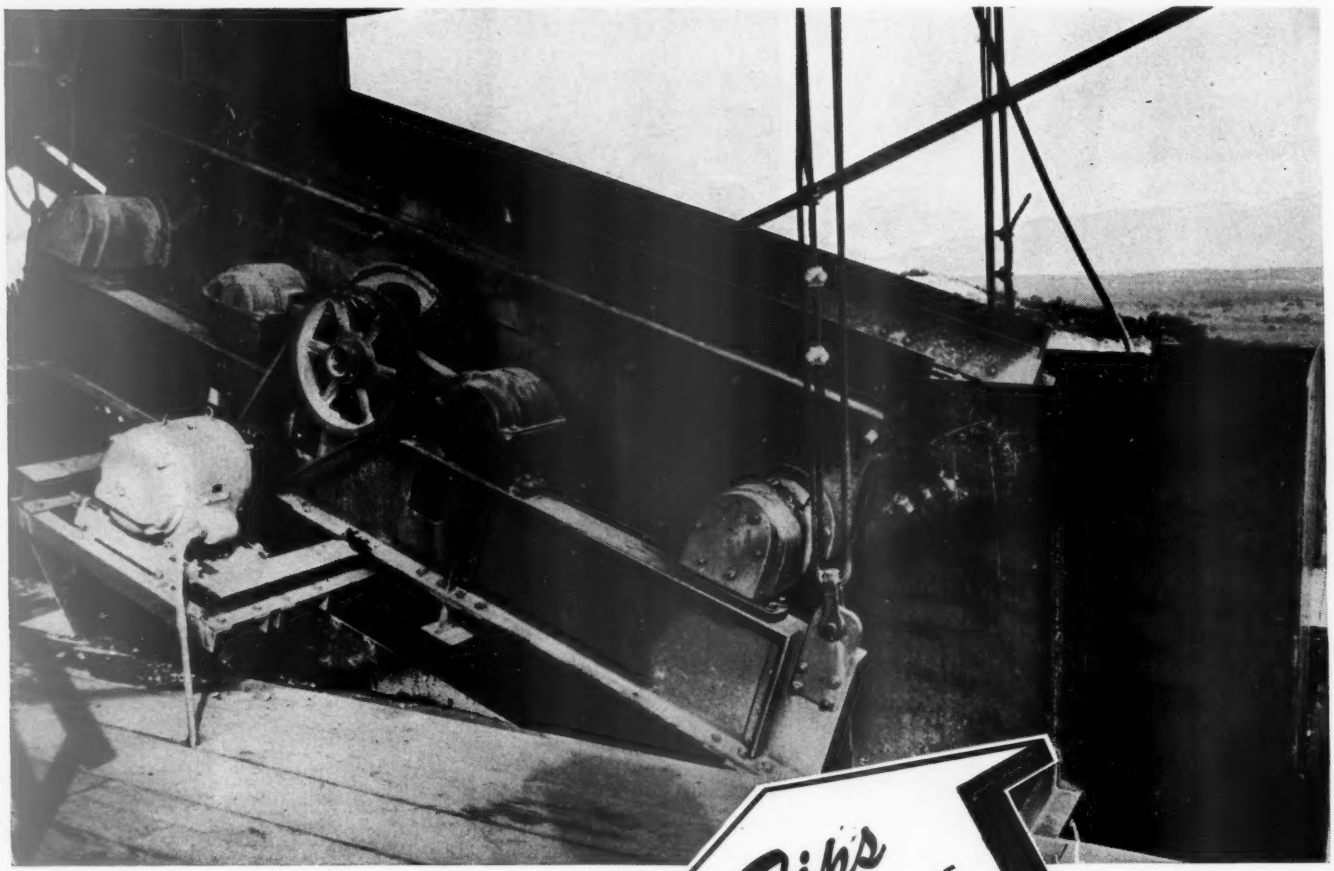


COMPRESSORS • TURBO BLOWERS • ROCK DRILLS • AIR TOOLS • OIL AND GAS ENGINES • CONDENSERS • CENTRIFUGAL PUMPS

SCREENS *BIG TONNAGE ON SKF BEARINGS*



● *Built by* THE W. S. TYLER CO.

The way they take heavy gyrating loads on this rugged, well-balanced Ty-Rock 6′ x 14′ screen with its full-floating, circle-throw action . . . the way they stand up year after year requiring no adjustments, SKF Self-Aligning Spherical Roller Bearings prove they have full load-carrying capacity to handle large tonnages of rock. They combine low upkeep and power requirements with a liberal factor of safety against overloads. Advantages that are responsible for the success of SKF Bearings not only on the battlefields but in all types of quarry equipment as well. 5402

SKF INDUSTRIES, INC., PHILA., PA.

Tips
ON BEARING CARE
To make present equipment last longer
1. Use clean lubricant recommended by the manufacturer of this machine.
2. Avoid loads and speeds beyond those recommended by the manufacturer.
3. If necessary to remove bearings, keep them properly lubricated. Avoid the intrusion of water and dirt. Apply pressure on the inner race only. Don't hammer outer race.
SKF
BALL AND ROLLER BEARINGS

MIRA... DEBEN SER AMERICANOS!

RIGHT you are, Pedro! They *are* Americans! Americans with a war to win . . . *your* war and *ours*. And they're wasting no time about it! Your slumbering mountains have awakened to the echo of tooting whistles, the rolling of wheels, the hum of motors.

Day and night, in these open pit mines and quarries which dot the map from South America's tropics to Canada's frozen north, the big P&H Electric Shovels are clawing out the earth's treasures of metallic ores, coal and limestone —feeding blast furnaces and smelters where the roar of production swells into a crescendo of Victory.

Yes, real Americans they are, these P&H Electric Shovels. Born in Milwaukee, descended from a long line of excavators, they bring mass production methods with the speed and stamina that mean lower costs per ton wherever raw materials are dug in large volumes.

Big as today's wartime job may be, these machines are ready — ready to deliver faithfully until the job is done. And after that, they're ready to meet the challenge of tomorrow.

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Today America's magnificent highway trucking system has become the greatest production line in history — an endless chain in which over 4,500,000 trucks play their vital part in the miracle of America's war production. Either as raw material, or finished product, almost every bit of war equipment travels by truck. With truck manufacture halted for the duration, existing trucks and the men who drive and service them are doing a mighty job. Mack is doubly proud that the *extra* quality, *extra* strength, *extra* long life built into every Mack now means so much not just to Mack owners, but to the country as a whole!

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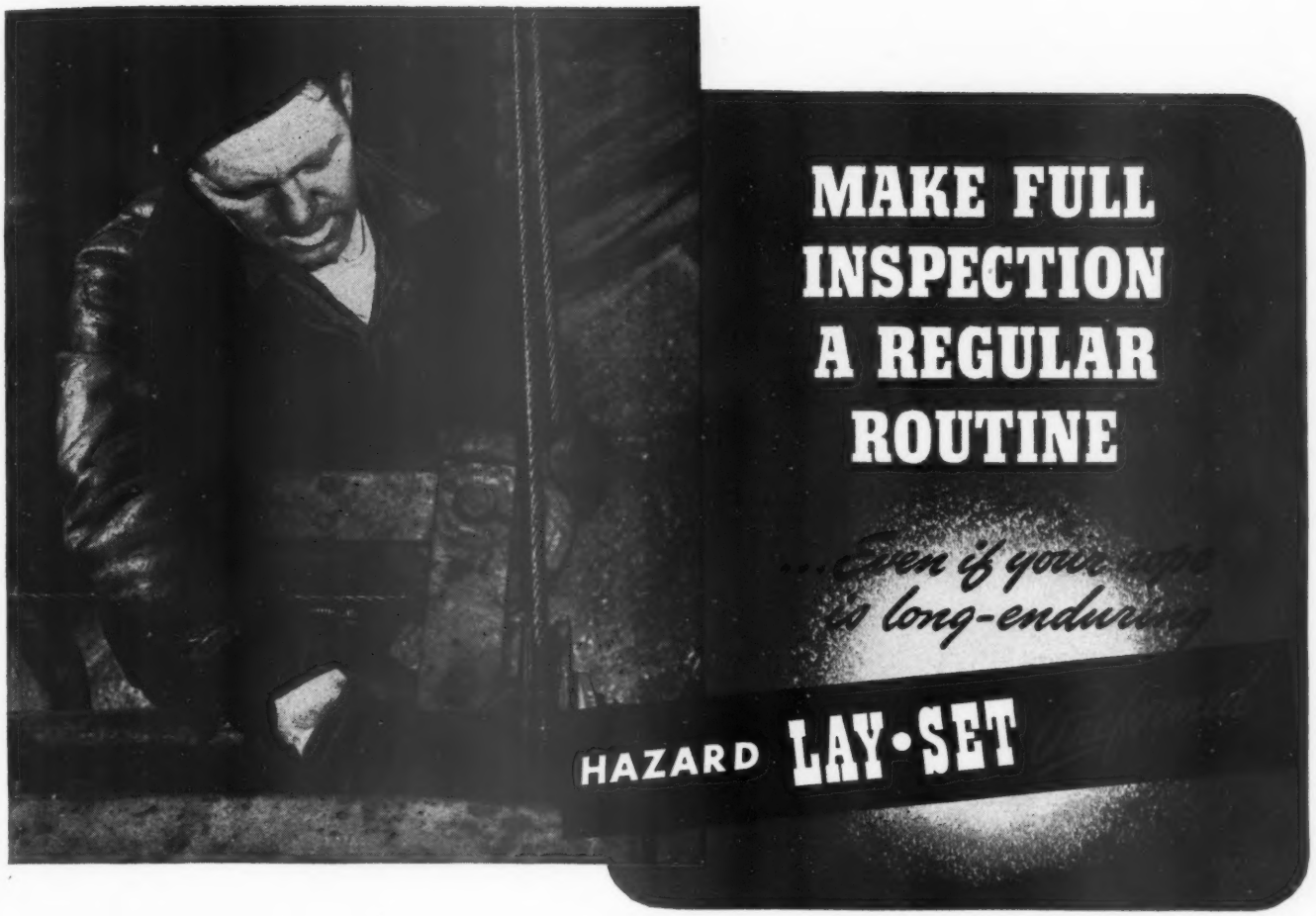

Both steel and production time are critical. Save both by regular inspection of your machines. Look especially to your wire ropes that operate them. Wire rope is expendable. Take care of it in order to receive its full service. And this applies to all ropes including **LAY-SET** Preformed, for while **LAY-SET** outlasts ordinary non-preformed wire rope, it too will respond to proper care by lasting *still* longer. Here are a few suggestions:

- Clean and lubricate all ropes regularly. Be sure hemp core is not dry or corrosion or collapse may occur. Tighten fittings.
- Be sure you are using the proper rope for the service. Consult your Hazard representative. He will be glad to give you the benefit of Hazard's 97 years of experience.
- If sheaves or drums are critical diameter, specify Hazard **LAY-SET** Preformed because of its high fatigue-resisting quality.
- Be careful of the fleet angle. Don't let the rope deviate more than 1½° from center plane of sheave or excessive wear will result. (Note how this condition is beginning to start in this picture.)
- Don't allow bad spooling for crushing may result. Hazard **LAY-SET** Preformed spools much better than most ropes.

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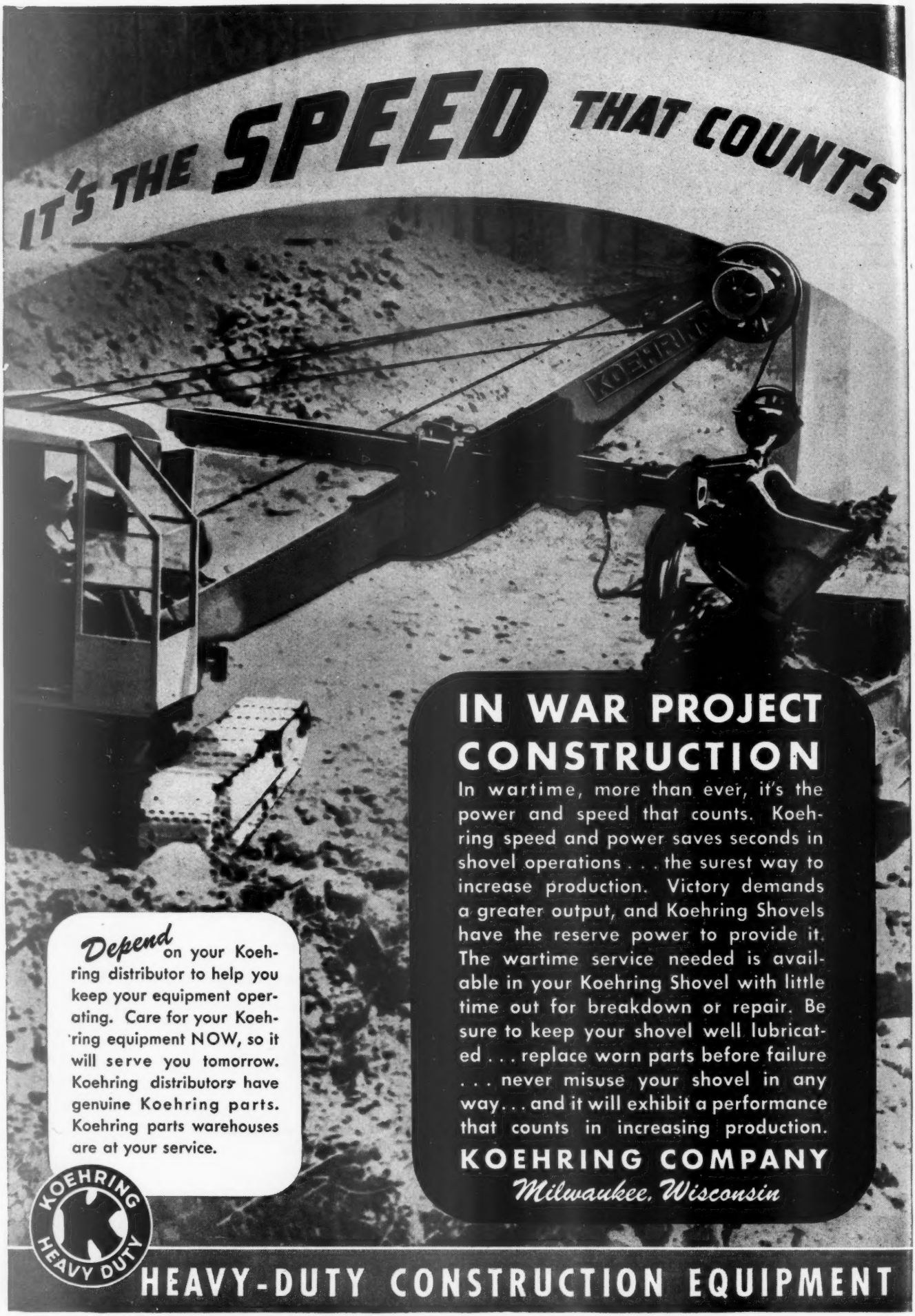
HAZARD LAY·SET WIRE ROPE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In wartime, more than ever, it's the power and speed that counts. Koehring speed and power saves seconds in shovel operations . . . the surest way to increase production. Victory demands a greater output, and Koehring Shovels have the reserve power to provide it. The wartime service needed is available in your Koehring Shovel with little time out for breakdown or repair. Be sure to keep your shovel well lubricated . . . replace worn parts before failure . . . never misuse your shovel in any way . . . and it will exhibit a performance that counts in increasing production.
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CEMENT MIXER SINGIN'

Boss happy, too, because Bemis RIP-CORD Closure Saves so much time on the job . . .

The cement worker's melody may be a little off key, but it comes from the heart. For the cement he is using comes in cotton bags closed with Bemis Rip-Cord Closure.

The Rip-Cord Closure can be opened easily without removing gloves . . . without tools . . . without tediously picking at wire or cord ties . . . without damaging the bag. Just a quick jerk on the rip cord and the bag is ready to empty.

Rip-Cord closing is efficient on your production line . . . brings economies on new bags . . . conserves storage space . . . increases the life of multi-trip bags as much as 50%.

Why not look into the possibilities of Rip-Cord economy and sales appeal for your product!

ASK THE MAN WHO OPENS THE BAG

If you want proof of the sales appeal and efficiency of the Rip-Cord Closure, ask the man who opens the bag. He'll tell you how a quick jerk opens the closure without damaging the fabric of the bag. This saves time and trouble . . . increases bag salvage. Rip-Cord closing may be used on any type of cloth cement bag.

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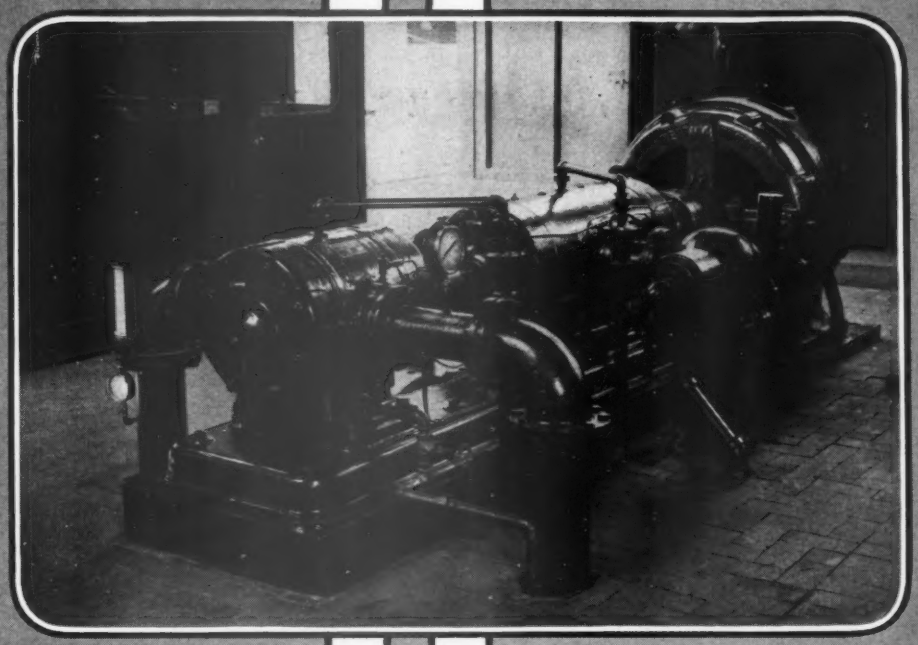

ROTARY COMPRESSORS

Fuller Rotaries are doing their part for victory in many war industry plants. Shown above is one of fourteen Fullers doing duty for an eastern steel company, running night and day with minimum time out for repairs.

They'll still be running long after victory has been attained and, at maintained original capacities . . . because they're built for just that kind of service. Simple design, rugged construction . . . only three moving parts: rotor—bearings—blades.

Bulletin C-5 illustrates and describes these machines. It's yours for the asking.

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C-84

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SYMONS SHORT HEAD CONE
for making those minus ½ inch sizes

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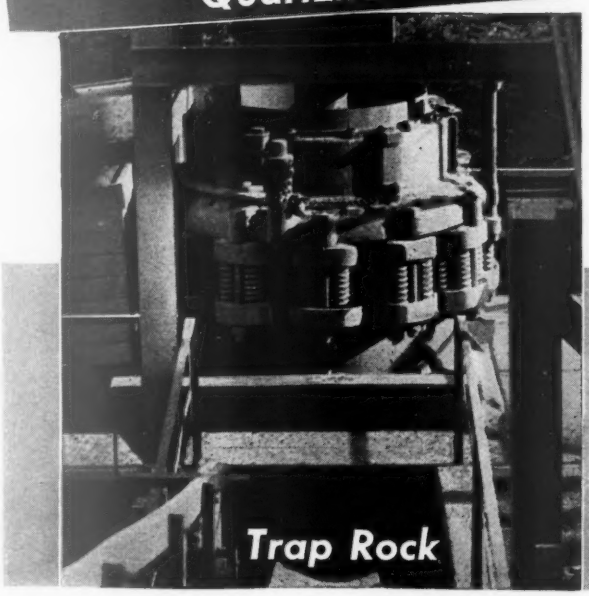
• • Still the world's outstanding crusher for fine reduction of all materials • •

Quartzite



Trap Rock

Making minus half inch material is a field for which the Symons Short Head Cone is primarily adapted. That so many of the larger producers of stone, gravel and slag should standardize on this crusher is evidence of its superiority for this class of work. Producers engaged in making those finer sized materials for black top and other types of stabilized roads will find this crusher exactly suited to their needs. There is no guesswork in the production of these fine materials with Short Heads. Obtain just the sizes you require in quantities that meet your demands and at a crushing cost which will assure of greater profit by doing your fine reduction crushing with a Symons Short Head Cone.

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2 **SAVE MANPOWER.** *Only one* operator is required on the St. Regis Valve Bag Packing Machine even when it is equipped with 2 or 4 filling tubes. So simple is the work involved that it can be quickly learned and skillfully performed by inexperienced hands. Since all lifting of bags is eliminated, the machine can be successfully operated by a woman where the manpower shortage is acute.

3 **SAVE MONEY.** Installed and operated at minimum expense and eliminating the need for any closing equipment, the St. Regis Valve Bag Packer assures lasting economy. Its outstanding service record in leading rock products companies shows 10, 15, 20 and 25 years of unbroken use.

4 The number of these machines available for immediate installation is limited. Should you be interested in a St. Regis Valve Bag Packing Machine, it would be wise to lose no time in communicating with our nearest office.

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Old Poker-Face is Losing Caste

BUYERS who imitate the clam and play their thoughts "close to the chest" never were very popular. They are less so now. "Not interested" is a dangerous reply in these days of new ideas, new ingredients and new methods.

Wise buyers lay their cards on the table nowadays. They talk their problems and hunt new ideas to rub against their own. They are seeking men whose minds will click with theirs to produce a 2 plus 2 equals 5 result. Synergistic thinking is the name for it and it is a growing habit in the quarrying industry.

So many new discoveries and methods are coming out of laboratory and field experience that it takes synergistic thinking to make full use of their possibilities.

Choosing the right explosive for the job is a case in point. The old days of "Make it 40%, at so much per pound" are on the wane. Nowadays explosives men and buyers get together to find exactly the right grade and the best procedure. The story has changed to, "Get the job done right, at the lowest cost, with the greatest conservation of men and machines to speed Victory and the Peace."

The very existence of more than one hundred grades of Atlas commercial explosives is a practical invitation to synergistic thinking with Atlas on the part of quarry men who may profit by "Better Blasting" applied to their job.

We will welcome the opportunity to practice synergism with you.

ATLAS EXPLOSIVES
"Everything for Blasting"

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WARTIME PROBLEMS of New Sand and Gravel Plant SOLVED BY...

TELSMITH

1 *Telsmith Super Scrubber*
2 *Two Telsmith Sand Classifiers*
3 *Telsmith Sand Drag*
4 *Telsmith Gyrasphere Secondary Crusher*

G-11

● **Hempt Brothers, Harrisburg, Pa., are quarry and gravel plant operators. War work demands for concrete necessitated building a new plant on a large deposit near Elizabethtown, Pa. Quantity processing of the crumbly quartzose conglomerate requires generous crushing, screening, classifying capacity. Yet co-operation with the war effort meant holding the use of new machinery and critical materials to a minimum.**

One of those tough, it-can't-be-done problems. But Telsmith Engineers came through with the right answer and the right equipment. The result is a balanced, flexible, smooth-working plant turning out 75-100 tons per hr. washed silica sand.

From a scalping screen following the primary breaker, plus ¾″ material goes to a No. 36 Telsmith Gyrasphere Secondary Crusher in closed circuit with the scalper. Minus ¾″ goes to a 4′ x 10′ Telsmith double deck Pulsator Screen over a 35-ton steel bin. One size of crushed gravel is stored in bin; and plus ⅜″ pebbles are chuted to a 40″ x 22″ Telsmith high speed, roller bearing Double Roll Crusher with adjustable flow belt feeder. This crusher is also in closed circuit. Minus ⅜″ sand size goes through a 72″ x 10½′ Telsmith Super Scrubber and then to two large-bowl, 3-side overflow, twin-screw Telsmith Sand Classifiers making concrete sand which goes to a 200-ton steel bin or to ground storage. Classifier overflow is flumed to a 60″ x 30′ Telsmith Sand Drag which produces plaster sand. For details on Telsmith equipment *get Bulletin G-15.*

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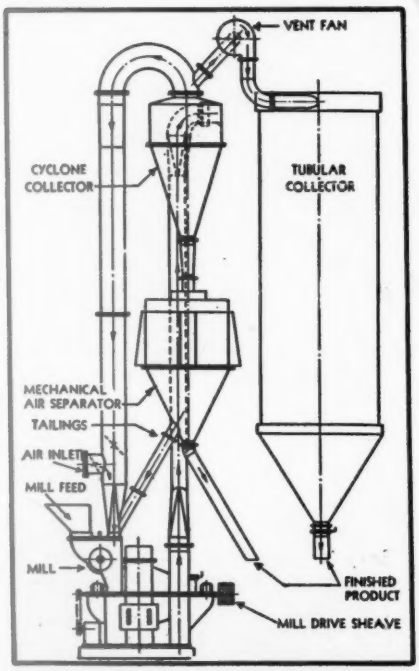
Standard Imp Mill at left, arranged for general grinding operations, as in reducing burnt lime and classifying it to uniform fineness by air separation. Also can be modified into a direct-firing unit for supplying small capacities of powdered coal to kilns, furnaces and stills.

For Closed Circuit Grinding

Flow sheet of the Imp Mill with Mechanical Air Separator and Tubular Collector for operations requiring extreme fineness and uniformity. The tailings go back to mill for regrinding.



Whizzer-Equipped

Imp Mill at right shown with Whizzer Separator which gives wide range fineness control and increased capacities on very fine materials. Variable speed transmission on whizzer drive permits control of classification from 80% minus 100-mesh to 99.5% passing 325-mesh.

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Today, the needs of the Government have the right of way, but with the brighter horizon, we definitely can look for that tomorrow, for which all are eagerly waiting, when Quaker can return to 100% production for peace time use.

That time when we can serve the sand, gravel, cement, crushed stone and kindred industries with all the rubber goods they need and when they want them.

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PIT AND QUARRY

Vol. 36 SEPTEMBER, 1943 No. 3

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. . . multiply life of hammer mill bearings 8 times!

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Bearing trouble was a big worry at one large cement plant. With the oil formerly used, bearings in their hammer mill heated excessively, burned out frequently. A new set of bearings was replaced after processing 150,000 tons of stone. Construction lagged, maintenance costs rose and precious man-hours were lost.

A Sun Engineer analysed the trouble quickly, suggested a switch to Sun Lubricants. Result . . . 1,200,000 tons of stone were processed to every bearing change instead of 150,000. Over a million extra tons!

In these days your hours of useful production are invaluable . . . many of your machines are not replaceable — protect them with performance-proved methods of lubrication. Put the efficiency of your equipment in the able hands of a Sun Oil Engineer. He's ready . . . willing . . . and able to help keep your machines on the job and producing without breakdowns or delays. Get in touch with your local Sun office . . . or write

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EDITORIAL

The Role of Government After the War

ALMOST fourteen years have elapsed since the onset of the economic crisis that choked business, impoverished large portions of the public and confused economic thinkers in the early 'thirties. In that time there must have been brought home to the minds of most men some small understanding of economic truth, some flash of the fundamental causes of economic stress, some vision of practical release from its burdens. Essential to the prevalence of such an understanding is a belief in the interdependence of men's economic well-being, and surely the events of the last decade—to take only the most recent segment of a long period of economic change—have made clear the basic truth that a balanced national economy can not exist unless there is a proper relationship between the economic positions of large and important sections of the population. The old theory that the blessings of plenty for a few would be so great and continuous that the mere overflow, trickling down to the lower economic strata, would provide a sufficient measure of contentment for the masses to prevent dangerous social unrest is no longer accepted as economic truth.

Large sections of the public seem to be prepared to accept, and perhaps even ready to demand, a continuance of government control in the economic sphere. There is much reason for believing that considerable pressure will be exerted to have those controls strengthened where they are already applied and to have them extended to other fields so as to eliminate the conflict that now produces confusion where there should be harmony.

It is difficult to escape the conclusion that the same kind of centralized control that has proved so effective in business and other forms of social activity is just as necessary, and would be accompanied by just as practical results if rigorously applied, in the field of the national economy. The scale of operations would inevitably be broader, since this management or centralized control would be applied on a national scale instead of being limited to the activities of a single business enterprise, for example. Its aims would be national, not sectional nor individual; its effects would be felt throughout our entire economy and not merely in one sector and the adjoining areas. Its object should be to encourage production free from the restraints imposed by individual control and to open the way for a form of distribution independent of the checks that can be, and have been, applied by those seeking to enforce private monopoly.

The idea of increasing government control is unpleasant to many people—not only those who feel the pinch of regulation, but also those who resent on the basis of principle alone any further hampering of the free action of supposedly free citizens. Yet many of these same people assert that some form of control is necessary and therefore inevitable, and most of them will probably admit it. They quarrel over the identity of the group that should exercise that control much more than they do over the need for it. They shrink from government control because of their suspicion of the integrity of political agencies, and yet they see no practical solution in the creation of some super-business control because of the fact that the conflict of profit-rivalry is essential to the continuance of business as such. In the dilemma they despairingly fall back on the feeling that maybe, after all, things should be left to drift lest, by any kind of human direction, they become even worse.

Any kind of control, if it is to be effective, must be centralized. To be fair it must operate without favor. To be national in its scope it must be free from local or individual influence. The man who sees everything through the colored glasses of self-interest will admit the validity of these fundamental principles quite as readily as the man who thinks hardly ever of himself but nearly always in terms of the general good.

The only type of organization we have that is fitted to undertake such a stupendous task is government. However far it may fall short of perfection—and frailty is as common in political circles as in any other form of human activity—it still occupies a unique position when compared with available or conceivable alternatives. It has the power, even if not always the will, to enforce the control principles that are deemed wholesome. If staffed by men trained for public service and imbued with the spirit of impartial and honest performance, it can meet the test of independence of local or individual pressure.

IT seems to us that government control is inescapable, that the area of its influence will become wider rather than narrower, and that its effects will touch our daily lives more intimately than most of us will like. But that control can be more equitable, more serviceable and more acceptable to us all, if restraining and corrective influences from the outside—from segments of the population such as business, agriculture, the professions, consumer groups and the like—are brought to bear in the interest of the general good rather than that of private gain. As the most powerful of these, business has great capacity for accomplishing good and permanent results if, instead of clinging to and even adding to its present feeling of antagonism and resentment toward government control in principle, it will undertake to play the role of partner, along with other sections of the population, in making certain that control will be applied wisely and fairly in the national interest.

Maximum production and full employment will be demanded by the majority of our people as conditions essential to their happiness and physical well-being. By working together, rather than in opposition, government and business can provide both, because a sharing of the responsibility will result in the elimination of conditions that prevent the attainment of those objectives.

High Explosive Efficiency

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ARMY E NAVY

We are ever mindful of the fact that the Trojan Powder Company developed and grew through constructive peacetime business . . . through the part our products have played in developing our Nation's resources. Today, our products are being used by America's Armed Forces to speed Victory . . . to hasten that day of peace toward which we, like all America, constantly strive with all our resources.

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World's Largest Direct-Fired Cement Kiln

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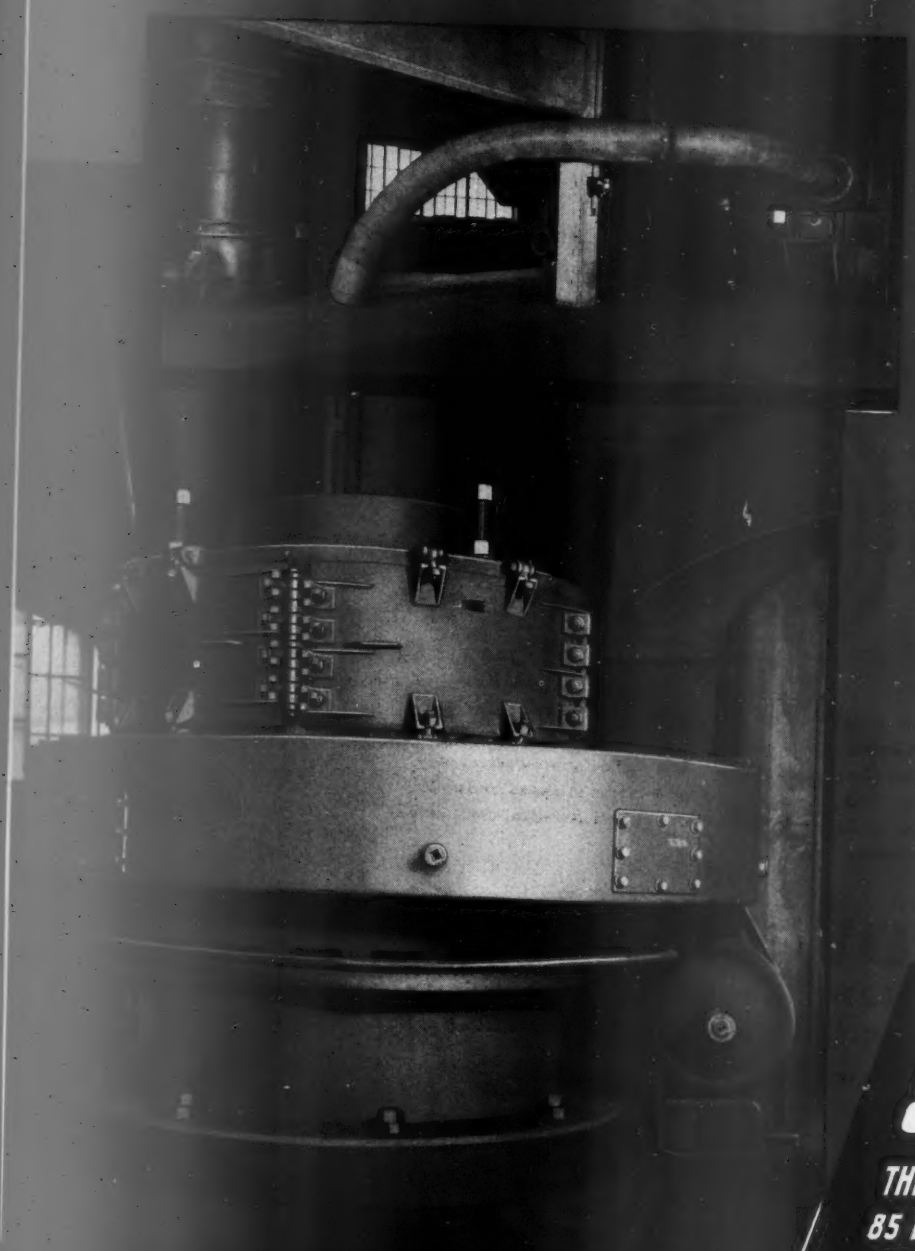

This pulverizer, at the plant of Marquette Cement Mfg. Co., Des Moines, Iowa, is the largest direct-firing pulverizer so far installed in a cement plant.

The kiln is 11 ft. 6 in. by 475 ft. (wet process); output averages approximately 3200 bbl. per day. Approximately 8 tons of Iowa coal are pulverized every hour, moisture in the coal running as high as 20 per cent.

The small photograph shows the firing floor and entrance to the kiln.

BABCOCK & WILCOX

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85 LIBERTY STREET, NEW YORK, N.Y.

PIT AND QUARRY

CHICAGO SEPTEMBER, 1943

Marquette Starts Building Cement Plant in Mexico

The Marquette Cement Manufacturing Company, Chicago, is entering the cement-manufacturing field in Mexico, according to W. A. Wecker, president.

Formation of Cementos Veracruz, S. A., has just been completed with Marquette holding the preferred stock and Cementos Atoyac, S. A., well-known Mexican producer, owning the common shares.

Construction of the plant and opening up a quarry near Orizaba, in the state of Veracruz, has already begun. Most of the equipment will consist of that formerly used in the old Hawkeye plant at Des Moines, acquired by Marquette two years ago. Much of the old Hawkeye equipment is available since Marquette largely rebuilt and re-equipped the Des Moines plant during the past two years. Limestone and shale deposits will be quarried to supply the new Orizaba plant with raw material.

Construction of the plant and technical supervision of its operation after completion will be directed by Marquette engineers. It is expected that production will start in July of next year. The annual capacity will be about 1,000,000 barrels.

Application to Dismiss Gypsum Case Is Denied

A special three-judge statutory court at Washington, D. C., on August 11 denied a motion of the United States Gypsum Company and associated firms for a summary judgment dismissing the government's anti-trust case against them.

The court ruled against the companies' arguments that because the defendants had been found innocent of monopolistic practices in criminal action brought by the government in district court, the civil action likewise should be dropped.

The decision, handed down by Judges Oscar E. Bland and Finis James Garrett, from the United States court of customs and patent appeals, said:

"It seems to us that it would be wholly illogical to conclude that one charged with a violation of the Sherman act could, by reason of an acquittal in a criminal case, thereby obtain immunity from any further remedy designed to bring about the discontinuance of a continuing offense."

Abercrombie Made Chief Engineer at Permanente

W. R. Abercrombie, formerly engineer at the Permanente Metals Corporation and Henry J. Kaiser Engineering and Development Division, has been made chief engineer of the Permanente Cement Company, Los Altos, California.

Mr. Abercrombie has had many years experience in the cement industry and prior to his affiliation with the Kaiser interests had served in various capacities with California Portland Cement Company, Atlas Portland Cement Company, and the Warrior Portland Cement Company.

Coming Events

October 5-7, 1943—Chicago. Thirty-second National Safety Congress and Exposition, National Safety Council. Hotel Sherman.

January 25-27, 1944—New York. Annual convention, National Sand & Gravel Association, Hotel New Yorker.

January 26-28, 1944—New York. Annual convention, National Ready Mixed Concrete Association, Hotel New Yorker.

Construction Takes 56 Per Cent. Dive in 7-Month Period

Contracts were let in July in the 37 eastern states, for 21,924 new family dwelling units, according to F. W. Dodge Corporation. This figure compares with 15,750 in the preceding month and 18,420 in July, 1942. Total residential building, including military barracks and accommodations for single men in temporary type dormitories in war production centers, amounted to $71,836,000 in July, $61,508,000 in June and $127,382,000 in July 1942.

Non-residential building, with a total value of $61,840,000, ran 35 per cent. below June and 87 per cent. behind July a year ago when manufacturing-plant construction was at its height. Of the $489,066,000 recorded in July 1942, 82 per cent. was for manufacturing plants.

Heavy engineering work in July, amounting to $49,985,000, also declined from the $73,257,000 registered in the preceding month and from the high figure of $327,308,000 attained in July last year.

During the first seven months this year, total construction contracts amounted to $2,034,933,000. This is a decline of 56 per cent. from the corresponding period 1942.

Santa Cruz Ordered to Abate Dust Nuisance

The Santa Cruz Portland Cement Company was ordered to abate a dust nuisance at its Davenport, California, plant in a decision handed down by Superior Court Judge J. L. Atteridge recently.

The change to dust-free operation was ordered to take effect within 90 days after the end of the war. The court not only ordered the abatement of dust but told the company how to go about it, specifically directing it to "install Lepol kilns to replace its present rotary kilns."

SHARE YOUR PIT AND QUARRY

● When you have finished with your copy of Pit and Quarry please pass it to someone else in your organization. By doing so you will not only be helping him by making the information it contains available to him, too, but you will also be helping your government which, because of the shortage of manpower, has been forced to place limitations on the use of paper by magazine publishers. We shall, of course, continue to send Pit and Quarry regularly to you and to all other subscribers. But we suggest this simple method of making Pit and Quarry available to a larger number of men at a time when the information it provides is most urgently needed and without increasing our consumption of paper.

Mica-Mining Activity to Decline After War Ends

Dim prospects of a permanent postwar mica industry in New Hampshire were depicted at a mineral meeting held July 30 in Newport, New Hampshire, with speakers pointing out that domestic costs of more than $3 per pound can not compete with costs of $1.11 and 92 cents per pound for Indian and Brazilian mica, even though the New Hampshire product is of equal or better quality.

These figures were given by S. A. Montague of the War Production Board's mineral division, and emphasized by Paul A. Tyler, eastern regional director of the U. S. Bureau of Mines.

It was pointed out that the government-subsidized price of $5 per pound now being paid by Colonial Mica Corporation is established for the duration only, to enable WPB to obtain strategic mica for military purposes. Both Montague and Tyler, however, urged the creation of a government stock pile after the war. Such a plan would continue the $5 price after the war long enough to obtain a three-year supply of mica and other strategic minerals.

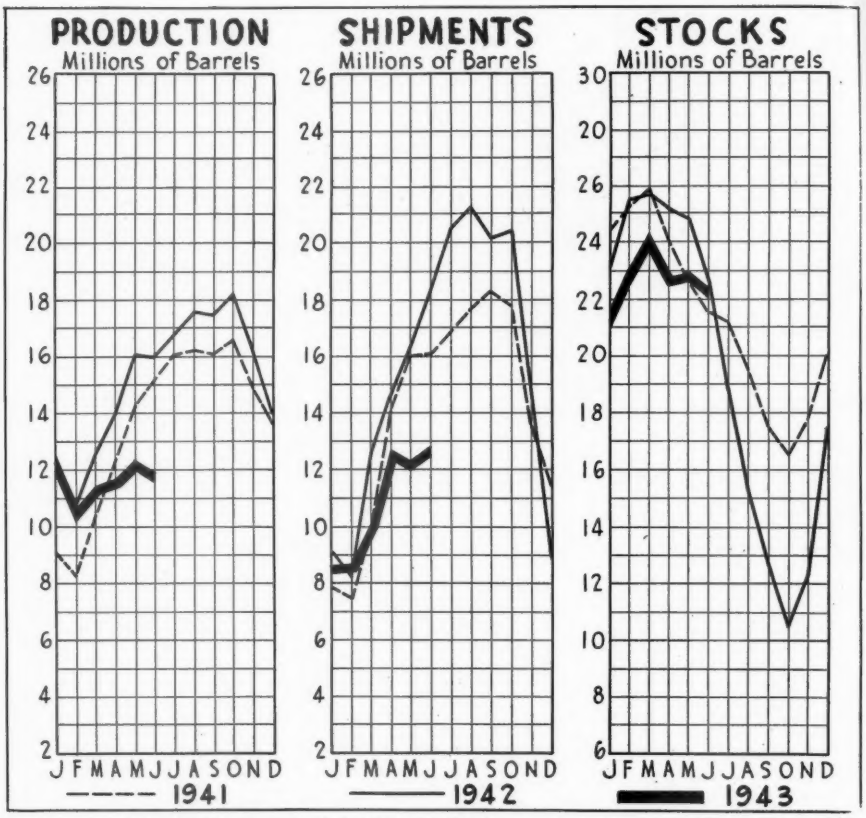
George A. Purcell, vice president of Colonial Mica Corporation, disclosed that New Hampshire's monthly production was now valued at $40,000, compared with $7,500 in 1941.

Paid Circulation of Pit & Quarry Among Nonmetallic - Mineral Producers In Recent Years:

CONTINUOUSLY FOR 26 YEARS THE LARGEST PRODUCER CIRCULATION IN THE FIELD

1942	(November)	6,650
	(May)	6,513
1941	(November	6,179
	(May)	5,945
1940	(November)	5,397
	(May)	5,037
1939	(November)	4,641
	(May)	4,617
1938	(November)	4,496
	(May)	4,366
1937	(November)	3,971
	(May)	3,772
1936	(November)	3,654

● **82% increase in 6 Years**

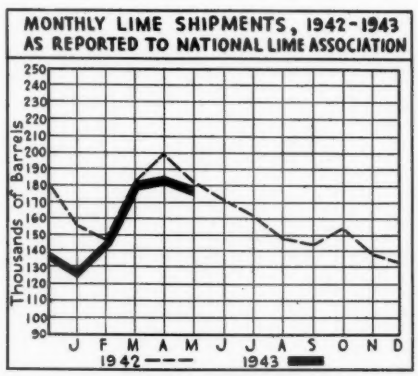


Production of 11,895,000 barrels of finished Portland cement in June was 26 per cent. below output in June, 1942 and 4 per cent. lower than in May, 1943. Shipments from mills during June 1943, as reported to the Bureau of Mines, United States Department of the Interior, were nearly one-third below June, 1942 and although they advanced 5 per cent. over May, 1943, the gain represented a slightly less than seasonal increase. Stocks of finished cement on June 30 declined 4 per cent. from those at the end of May, 1943 to a total of 22,084,000 barrels. Total shipments from mills during January-June, 1943 were 18 per cent. below the similar period of 1942; a less severe decline than shown by construction activity.

Construction Slumps to One-Half of Last Year

Construction awards in the 37 eastern states aggregated $1,851,272,000 during the first six months as compared with $3,723,725,000 in the corresponding period of 1942, according to F. W. Dodge Corporation. The decline in the three major categories were: non-residential building down 54 per cent., residential building down 50 per cent., and heavy engineering work down 44 per cent.

The greatest dollar declines were in manufacturing buildings, miscellaneous non-residential buildings, public works, utilities and one-family houses all of which are types of construction which were pushed in 1942 so as to expand the nation's war production capacity and to provide military and naval training facilities.


MONTHLY LIME SHIPMENTS, 1942-1943
AS REPORTED TO NATIONAL LIME ASSOCIATION
Thousands of Barrels
J F M A M J J A S O N D
1942
1943

According to data collected by the National Lime Association, 63 companies in June, 1942, shipped 175,033 tons of lime (112,529 quicklime; 62,504 hydrate). Reporting companies represent 43.4 per cent. of the association's total capacity of record. Based on PIT AND QUARRY'S estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 520,000 tons. Shipments of lime by users for June, 1942, were:

Use	Quicklime (tons)	Hydrate (tons)
Agricultural	913	18,682
Building	14,051	20,964
Chemical	97,565	22,858
Total	112,529	62,504

Production of Sand and Gravel Reached New Peak in 1942

Approximately 5 per cent. more sand and gravel was produced in the United States in 1942 than in 1941 and for the fourth successive year a new record was attained, according to figures released by the Bureau of Mines.

The total output of sand and gravel was 304,346,000 short tons valued at $188,500,000 in 1942, and 288,715,000 tons at $147,207,000 in 1941. Contractors and construction or highway-maintenance crews employed by federal, state, county and municipal governments accounted for approximately 23 per cent. of the production compared with 37 per cent. in 1941.

With the increase in activity came an appreciable improvement in efficiency and firmer prices, counter-balanced by rising operating expenses in the form of increased wage, transportation, and material costs. Private building, highway construction, and many large public works projects like those of the Works Projects Administration were curtailed or eliminated to concentrate the efforts of the industry on more critical wartime construction.

Commercial producers reported sales of 232,947,787 tons valued at $159,427,273 in 1942 compared with 181,556,467 tons at $114,706,913 in 1941, an increase of 28 per cent. in quantity and 39 per cent. in value. The average value was 68 cents a ton in 1942 and 63 cents a ton in 1941.

Prepared material (washed, screened, etc.) amounting to 200,131,369 tons accounted for approximately 86 per cent. of commercial production. The average value was 73 cents a ton for prepared and 38 cents a ton for unprepared sand and gravel.

Of the total commercial output 47 per cent. was shipped by truck, 43 per cent. by railroad, and 10 per cent. by waterway.

Output of government and contractor operations decreased 33 per cent. to 71,399,000 tons in 1942 from 107,159,000 tons in 1941. Approximately 28 per cent. was washed, screened, or otherwise prepared and its average value was 67 cents a ton, whereas unprepared material brought 30 cents a ton. Construction and maintenance crews of states, counties, municipalities, and other government agencies produced 36,911,000 tons averaging 29 cents a ton; 34,488,000 tons averaging 53 cents a ton were produced by contractors expressly for those agencies.

Indianapolis Gravel Superintendent Dead

Rollie F. Hamm, 51, for the last 25 years superintendent of the plants of the Indiana Gravel Company at Indianapolis, died at his home in that city on August 13. He had been ill nine months and was a patient in the United States Veterans' Administration Hospital during most of that time.

During his early life he served in the United States Navy and in the World War I was in Company A, 55th Engineers' Corps. The widow, a daughter and a son, the latter a corporal in the army, survive him.

Driller Meets Death in Kentucky Stone Quary

Henry Horn, 58, was killed intantly and Charles Marshall was injured seriously recently when they were crushed beneath a dislodged section of stone in the Kentucky Stone Company quarry at High Bridge. The men were operating a drill at the time of the accident.

Shovel, Crane Output Goes to Armed Forces

Nearly the entire estimated output of the power shovel and crane industry up to the close of 1943 will be absorbed by military orders, according to the Industry Advisory Committee, with the exception of certain sizes of equipment needed in mining, quarrying, and other essential civilian work. The Committee states that used equipment should take care of most other civilian requirements if full utilization is made of all available supplies.

The armed services have placed their orders for the remainder of 1943, and the Army has also placed orders covering its requirements for the first six months of 1944. Other claimant agencies are being asked to make known their needs for the first half of 1944 insofar as possible.

Rock-Wool Employees Enjoy Annual Picnic

Employees of the American Rock Wool Corporation of Wabash, Indiana, and their families, held their annual picnic on Saturday, August 5 at Long Lake near that city.

All amusement and other facilities at the lake were leased by the company for the day.

Bert Williams, One of Lime Industry's Pioneers, Is Dead

Bert B. Williams, 69, president of the Western Rock Wool Corporation of Huntington, Indiana, until its sale early in July to the Baldwin-Hill company, Trenton, New Jersey, died at his home in Huntington on August 2 after two years of failing health.

Mr. Williams was associated with the lime industry from early manhood. His active career began in 1898 when he took a position with the Mitchell Lime Company. In a short time he was made treasurer of the company. In 1903 he became manager for the Marblehead Lime Company of Chicago with plants at Hannibal, Missouri, and Quincy and Marblehead, Illinois. He later was part-owner of the Hoosier Cement Company at Limedale, Indiana, afterward sold to Lehigh. He was president of the Western Lime & Cement Company at Milwaukee for eight years and a director of the Great Lakes Portland Cement Company.

The Huntington rock-wool plant was established in 1935. Mr. Williams had decided to retire but was unused to inactivity and found in Huntington stone raw material suitable for insulation manufacture.

Profits of National Gypsum Rise Slightly

Net profit of the National Gypsum Company in the first half of 1943 was $442,658, equal to 22 cents a common share, President Melvin H. Baker reports. This compared with $401,053 or 19 cents a share in the first six months of 1942. Sales rose to $10,585,292 in the first half of the year from $10,211,421 in the same six months last year.

Lime-Fuel Ratio Was Reported in Reverse

In describing the conversion of the Peerless Portland Cement Company's Port Huron plant to lime production in the July issue of PIT AND QUARRY it was stated that "fuel consumption is varying between 3½ and 4 tons of coal per ton of lime."

This was an error of transcription—such a fuel ratio would produce mighty expensive lime! Actually, of course, 3½ to 4 tons of lime is being produced per ton of coal consumed.

Output of Crushed Stone Continues at High Level—Bauman

The Executive Committee and Board of Directors of the National Crushed Stone Association held their semi-annual meetings at the Homestead, Hot Springs, Virginia, on July 29 and 30.

The resignation of Stirling Tomkins from the board, necessitated by his absence while serving the American Red Cross in North Africa, was accepted by the board, and Wilson P. Foss, chairman of the board of the New York Trap Rock Company, of which Mr. Tomkins is president, was elected his successor. Filling of the vacancy on the board created by the death on March 22 of T. Ward Havely, president of the Central Rock Company, was held over to the next convention. To succeed Mr. Tomkins as a member of the Executive Committee Fred O. Earnshaw, president of the Carbon Limestone Company, was elected.

In view of the increasing burden on the country's transportation facilities as expressed in a recent letter from the head of the ODT urging that no conventions be held, the board decided to take no action with regard to the holding of a convention in 1944, leaving the decision to the Executive Committee with the recommendation that the dates be January 31 to February 2 and the place the New Yorker in New York.

Edward A. Bauman, technical adviser on nonmetallics to the Mining Division of the WPB, spoke briefly on some of the problems involved in the administration of Preference Rating Order P-56, which are increasing due to the enlarged activities and more numerous divisions of the WPB. Limitation orders are having their effect in the granting of allocations to mining companies and may make it necessary for the mining industry to place its case before the WPB so that P-56 can be cleared of the limitations imposed on it by other WPB divisions.

Mr. Bauman said that form PD-731 is still good for requests for new equipment, and form PD-556 is the form to be used in making application for construction equipment listed in Limitation Order L-192. The latter should be filed with the Mining Division which will then forward it to the Construction Equipment Division.

Mines, said the speaker, are exempt from the provisions of Limitation Order L-41 which limits construction. For example, a warehouse built to protect machinery is exempt because it is considered as part of a mining operation. Materials for a warehouse built to store supplies should be applied for on the PD-200 form. Houses for employees are handled in other ways.

Mr. Bauman said that a 25 per cent. reduction in the output of the aggregates industry had been expected in 1943, but that in the first half of this year the production had apparently been almost equal to that of the first half of 1942, and that output in the third quarter of 1943 appeared to be about equalling that of the same quarter of last year. His statements were based on the evidence of continuing production activity provided by the allotment applications being filed by producers.

Agricultural limestone is now recognized as being of vital importance and new equipment for producing it will be provided wherever necessary. This material is now on practically the same priority-treatment level as crushed stone for railroad ballast.

In Mr. Bauman's opinion, the mining industry will continue to be subject to WPB control for some time after the war, as the WPB can not allow a flood of new equipment to be made. The aggregates industry will enjoy a front seat in postwar activities and in priority assistance, he said.

Otho M. Graves, chairman of a special committee on membership promotion, reported that $16,000 had been pledged by the membership for the purpose. The program accepted provides for the employment of a full-time field-promotion engineer for a two-year period beginning October 1.

Red Cross First-Aid Detachment at Lehigh's Fogelsville Plant

American Red Cross volunteer first-aid detachment of the Fogelsville, Pennsylvania plant of the Lehigh Portland Cement Company. Front row: C. P. Benner, assistant director of safety and welfare; Earl Haring; Henry Greenawald; Fred Herman; Stephen Schwartz; James Schreiner; Howard Reitz; Harold Mohr. Second row: W. W. Frailey, assistant director, safety and welfare; Francis Laudenslager; William Haring; Walter Keiser; John Schwartz; Harry Olaynick; Harvey Schmick; Mike Waricher; Ralph Werley. Rear row: Dr. H. E. Guth, plant physician; Carl F. Kocher, first-aid instructor; Edwin Keeley, chairman first aid; Herman Klotz; LeRoy Moyer; Woodrow Neff; Harold Foose; Woodrow Lehr; Evan Holben; Stephen Perrine; Carl Ebert; George Paduch; R. A. Moritz, superintendent; Thomas C. Kuhns, chemist.

Blast in Calaveras No. 4 Quarry Brings Down 510,000 Tons

The Calaveras Cement Company's quarries near San Andreas, California, have long been noted for the large blasts made there. Some of these have been of near-record proportions and have been given wide publicity.

On October 10, 1942, the latest of this series of spectacles was staged, with the usual large audience. Quarry Number 4, in which this blast was made, had been worked in a single 170-foot face. After this blast it will be worked in two benches, as the increasing height of the face was felt to be making the operation inefficient and unduly hazardous. The holes for this shot were drilled in two rows with the first row extending below the quarry floor and the second row starting the second bench. The holes in the first row were drilled with 17.84 foot spacing and were from 120 to 166 feet in depth. A total of 107,500 pounds of explosives brought down an estimated 510,000 tons of rock.

Start of the blast.

During the blast.

After the blast.

A brief record of this blast follows:

Drill Holes Fired	
No. 201 to 276 inclusive	
No. 286 to 295 inclusive	
Total Footage of Holes	
1st Row	5,798
2nd Row	1,993
Bench Approach	360
Total	8,151
Total Effective Footage	7,596
Explosives Used (Cases)	
1st Row	1,639
2nd Row	437
Bench	74
Total cases	2,150
Total pounds explosive	107,500
Tons Broken	
1st Row	398,700
2nd Row	76,300
Bench	9,000
	484,000
Estimated Overbreak	26,000
Total Tonnage	510,000

Magnesite Production Highest in History

Mine output of domestic crude magnesite in 1942 reached the all-time high of 497,368 short tons, an increase of 33 per cent. over the 1941 production of 374,799 short tons. Increased requirements of basic open-hearth steel furnaces for dead-burned magnesia refractories was the chief factor in the record magnesite output, but demand for caustic-calcined magnesia in plastic magnesia flooring and magnesium metal manufacture also stimulated production.

Sales of dead-burned magnesite increased in 1942, exceeding the record 1941 shipments. The bulk of the output was consumed in the construction and repair of basic open-hearth steel furnaces, though some of the purer material was used in brickmaking. An impending shortage of magnesite brick was alleviated by increased use of periclase with chrome ore to form the "kromag" type of brick, said to be interchangeable with or even preferable to all-magnesite brick in certain areas of open-hearth steel furnaces.

Output of Crushed Stone Reaches Total of 194,537,030 Tons

The total output of crushed and broken stone in the United States in 1942 as reported to the Bureau of Mines by producers amounted to 194,537,030 short tons valued at $188,300,436, an increase of 7 per cent. in quantity and 8 per cent. in value compared with 1941. Included in this total is stone sold or used for concrete aggregates, railroad ballast, riprap, agricultural limestone, refractory stone, stone for metallurgical use (flux), limestone sand, alkali works, calcium carbide works, sugar and glass factories, paper mills, and in various other chemical and manufacturing processes. Stone used in the manufacture of lime, cement, and asphaltic stone, and slate used for granules and flour are not included in this total.

Crushed or broken stone used for concrete aggregates and railroad ballast constituted 64 per cent. of the output in 1942—125,267,650 short tons valued at $116,394,778. Production by commercial companies increased 27 per cent. in 1942 compared with 1941, whereas production by government agencies declined 55 per cent.

Crushed stone for metallurgical purposes (30,262,910 short tons valued at $24,152,113), which ranks next to concrete aggregates in quantity consumed, increased 10 per cent. in quantity and 20 per cent. in value. Limestone for agricultural use (13,745,400 short tons valued at $16,993,254) increased 15 per cent. in quantity and 18 per cent in value. Refractory stone (ganister, mica schist, dolomite, and soapstone) amounted to 2,718,090 short tons valued at $3,999,929, an increase of 21 per cent. in quantity and 22 per cent. in value.

1,500-Ton Plant Set Up Near Plum, Texas

Using equipment which was available on lease in various parts of Texas, the Texas Construction Material Company is assembling a complete sand-and-gravel plant at Plum, four miles from La Grange, Texas, according to S. G. Smalley, production engineer for the company. The plant will have a capacity of 1,500 tons daily.

The main part of the plant was brought from West Point, Texas, and a dredge boat came from east Texas.

WASHINGTON NEWS LETTER

another PQ exclusive

THERE is no evading the seriousness of the current lag in output of implements of war. Production authorities have been frank in admitting that munitions output in May, June, and July fell below schedule. This situation has been given wide publicity in the last few months, accompanied by the usual pep talks from public officials, with the consequence that much confusion has resulted as to the reason and remedy for the production lag.

It must be understood at the outset that there has been no real drop in the volume of munitions output, which is higher now than ever before. Fluctuations from month to month have never been particularly significant in themselves, because of the method used in reporting production progress, especially for such items as planes and ships, which have a long production period. The much-discussed "lag" is, in fact, a failure to attain all of the scheduled production gain in recent months, rather than a leveling off or decline in output.

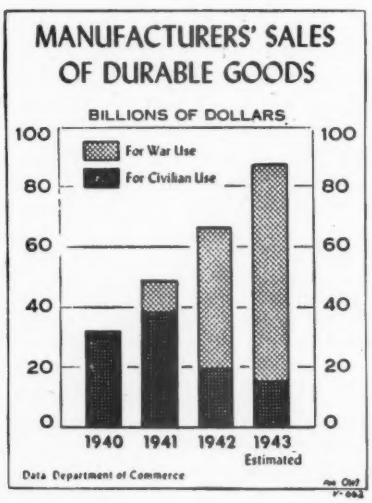
To state the matter another way, we are failing to meet the scheduled "rate of increase" which was set early in the year at approximately five per cent. per month in 1943. It is readily seen that to maintain this steady rate of acceleration it is necessary to raise production in successive months by progressively greater increments. Conversely, even if production rose each month by the same absolute amount, the schedules would be missed and deficits incurred.

At this stage in the production program, constantly expanding increases in overall munitions output are exceedingly difficult to achieve. This is because of the tendency on the part of the armed forces to concentrate their productive efforts, often through the diversion of materials and components, upon the more urgently needed types of equipment rather than upon other items which may be easy to produce but which are of lesser strategic importance or in comparatively plentiful supply. At the same time, it is generally in the highly strategic munitions that interruptions to production resulting from design changes, introduction of new models, and readjustment of schedules are most numerous. Thus, what worries Washington officials is not so much that the 1943 total production goals will be missed, although this is serious enough, but that the deficiencies will occur in those programs in which the damage to the war effort will be greatest.

The question which naturally arises is what can be done to improve this situation. Some observers have interpreted the production lag as a sign that we are approaching our maximum potential in the output of war materials. This point does not stand up under examination. The schedules calling for a five per cent. monthly increase in 1943 were cut back early in the year from originally higher totals and were deemed by production officials at that time to represent a feasible goal well within the limit of our productive capacity. The real capacity of the nation in terms of its resources for war production—materials, capital equipment, and manpower—far exceed any schedules which have yet been established.

The extent to which the weapons of victory can actually be made to flow from our war plants depends upon two basic factors: the portion of the national resources which we make available for war purposes, and the degree of success with which these resources are mobilized.

The first of these involves sacrifice on the part of the civilian economy. The near-success which attended the bill introduced in the last session of Congress to establish an independent agency to handle civilian supply problems has had its effect on the WPB, and has resulted in the anomalous situation of that agency's bewailing the complacency and over-optimism of the citizenry on the same day that it announces the consideration of new plans for expanded civilian output. How this will be accomplished without interference to the military programs has not yet been explained.



The second point involves the controls instituted and exercised over the various factors of production. There is much room for improvement in this direction. In fact, aside from the technical impediments to production, the current lag can be attributed largely to the failure to follow through on some of the production controls recognized early in the game as the necessary preventive of many of our ills. This is especially true of the scheduling of critical common components, in which many false starts have been made recently, but which still remains an unresolved problem.

The manpower problem is another in which we have been extremely slow in invoking adequate controls. It is too early to judge whether Regulation 7, issued by the WMC on August 16, will achieve its stated objective of maximizing the utilization of manpower resources through "the elimination of wasteful labor turnover in essential activities, the reduction of unnecessary labor migration, (and) the direction of the flow of scarce labor where most needed in the war program." The new order sets up minimum standards for local employment stabilization programs. Although the general limitations on job transfers have been drastically tightened, broad powers of exception are given to local and regional WMC offices in the determination of whether such transfers are in the interest of the war effort. The ultimate success of the plan will depend chiefly upon the interpretation of the "effective prosecution of the war" clause and upon the machinery set up to enforce compliance. The decision to give priority on draft deferments to persons engaged in certain super-critical occupations should help to flow manpower in the right directions.

One thing in the manpower situation is clear. The present plan is the last attempt that will be made to provide labor needs for war production through voluntary methods. If it proves inadequate, the proponents of a national service law will find little Congressional opposition at the forthcoming session.

FLUORSPAR.— The Fluorspar Section of the War Production Board July 26 urged producers to increase prospecting for and development of new deposits of the mineral if they wish to retain the total benefit of their recently acquired price increase. This problem was among those discussed at the last Fluorspar Industry Advisory Committee meeting in Washington. The WPB pointed out that $1.50 of the $5 per ton increase was granted specifically for development and prospecting purposes, and that if the present lag in that activity is not soon corrected the Office of Price Administration has the right to cut back the price.

Latest figures indicate that production is running behind consumption by about 3,000 tons per month.

At the committee meeting some members of the industry reported that the new wage and price adjustments are working out well and appear beneficial to both labor and industry. Industry members cited certain omissions in job classifications which were called to the attention of a representative of the War Labor Board. Also, the WLB was asked to clarify certain points in the new salary adjustments and their relationship to existing union contracts. The industry representatives felt that these clarifications should be obtained at this time in order to prevent any possible misunderstandings arising in the future between employers and employees over interpretations.

The consensus of opinion at the meeting was that further changes would be undesirable now and that the industry should live with the new regulations and develop a smooth program of production that would realize the potential capacity of fluorspar output.

MACHINERY PRICES— Maximum Price Regulation No. 136, as amended, is amended, in the following respects:

1. In § 1390.2 (f) the first sentence is amended to read as follows:

(f) Any sale or delivery at retail of a machine or part by a person other than the manufacturer thereof, except that the sale or delivery at retail of automotive trucks, trailers and busses as described in § 1390.33 (c) shall not be excluded from, but shall be covered by, this regulation.

2. Section 1390.11 (e) is amended to read as follows:

(e) *Maximum prices; secondhand machines or parts sold when new on delivered or installed price basis only*—(1) *Sold when new on delivered price basis only.* Notwithstanding any other provision of this section, if the maximum price for any secondhand machine or part established by this regulation when such machine or part is sold new, is on a delivered price basis only, the new base price upon the sale of such machine or part shall be the highest maximum price to any class of purchasers for the nearest equivalent machine or part when new, delivered to the point where such secondhand machine or part is located at the time of purchase by the seller.

(2) *Sold when new on installed price basis only.* Notwithstanding any other provision of this section, if the maximum price for any secondhand machine or part established by this regulation when such machine or part is sold when new, is on an installed price basis only (that is, a lump sum covering the cost of the machine or part, the cost of transportation, and the cost of installation), the new base price upon the sale of such machine or part shall be the price for the same machine or part when new, installed at the point of original installation.

3. Section 1390.20 (a) is amended by adding to the end thereof a sentence to read as follows:

It shall also be a violation of this regulation for any person to pay, in connection with the purchase or rental of any machine or part, whether new or used, or the purchase of any machinery service, any fees, commissions, or other compensation, whether for broker's, agent's or finder's services, or otherwise, which, when added to the amount paid by such person for the purchase or rental of such machine or part or the purchase of such machinery service would result in a total sum exceeding the applicable maximum price established by this regulation.

4. In § 1390.33 (c) a new item is added to read as follows:

New automotive trucks, trailers, and busses, originally designed for use as private or commercial motor vehicles, which are manufactured on or after August 12, 1943, when sold by any person. The foregoing does not include automotive trucks, trailers, and busses specially designed for use as military vehicles; nor does it include cars and trucks covered by § 1390.32 (g) as "Material Handling Equipment."

5. In § 1390.33 (c) the item: "Gears, pinions, sprockets and speed reducers specially designed for use in vehicles, aircraft or equipment used primarily for military purposes" is amended to read as follows:

Gears, pinions, sprockets and speed reducers, except automotive or tractor transmissions, transfer cases, power take-offs, differentials or axle assemblies, specially designed for use in vehicles, aircraft or equipment used primarily for military purposes.

This amendment shall become effective August 12, 1943.

(Pub. Laws 421, and 729, 77th Cong.; E.O. 9250, 7 F.R. 7871; E.O. 9328, 8 F.R. 4681.)

Issued this 29th day of July, 1943.

PRENTISS M. BROWN,
Administrator.

MINING ALLOTMENT AND NEW-EQUIPMENT PROCEDURE.—By a letter dated August 15 A. S. Knoizen, director of the Mining Division of the WPB issued new allotment forms (WPB 2939) and instructions for the nonmetallic-mining and other mining industries. The new provisions allow higher percentages of controlled materials in the fourth quarter of 1943. The full text of the letter is given below.

The definition of quota items was revised as of August 9 and the text of the new schedule also appears below.

WAR PRODUCTION BOARD
Washington, D. C.
August 15, 1943

In reply refer to: Mining Division Reference P-56 CMPL-391.

Letter to accompany fourth quarter PD-400 certificate.

TO HOLDERS OF SERIAL NUMBERS UNDER ORDER P-56:

1. *PD-400 Certificate.* — The accompanying PD-400 certificate,[1] now designated as WPB-2937 for metal mines, WPB-2938 for coal mines, or WPB-2939 for non-metallic mines, assigns an allotment number and a preference rating for the fourth-quarter allotments of controlled materials and quotas of other materials indicated in column (i).

2. *Endorsement and Certification of Orders.*— In placing purchase orders under any quota authorized on this certificate, you should use the following certification prescribed in CMP Reg. No. 7 and should indicate the assigned rating, the allotment number, and your serial number under Order P-56:

Allotment number .....
Preference rating .....
P-56 serial number .....

"The undersigned purchaser certifies, subject to the penalties of section 35 (A) of the United States Criminal Code, to the seller and to the War Production Board, that, to the best of his knowledge and belief, the undersigned is authorized under applicable War Production Board regulations or orders to place this delivery order, to receive the items ordered for the purpose for which ordered, and to use any preference rating or allotment number or symbol which the undersigned has placed on this order."

3. *Use of Allotment Numbers.*—The allotment number should be certified in the usual abbreviated form, as S-7-4Q43 for the fourth quarter of 1943. On controlled materials orders, the abbreviation of the month when delivery is required should be added. The allotment number no longer has any up-rating effect, but this number, as well as the preference rating, is to be placed on all orders for purposes of identification.

4. *Advance Allotments of Controlled Materials.*—All previous advance allotments made to you for the fourth and subsequent quarters are superseded by the allotments on the accompanying certificate. If advance orders, placed by you, exceed this new allotment you are required to cancel the excess amounts.

Advance orders for deliveries of controlled materials in subsequent quarters may be placed as follows:

For the first quarter of 1944 up to 90% of the fourth-quarter allotments.

For the second quarter of 1944 up to 80% of the fourth-quarter allotments.

For the third quarter of 1944 up to 50% of the fourth-quarter allotments.

Allotment numbers assigned for deliveries in advance quarters must show the proper abbreviation for the quarter, as 1Q44, 2Q44, or 3Q44. Deductions from the advance allotments are to be made at the time your order is accepted and are to be charged against the quarter indicated by the allotment number.

Controlled materials must be delivered in the quarter for which the order is accepted. There is no carryover of controlled materials from one quarter to another.

Advance allotments must be calculated only on the basis of the original allotments assigned for the current quarter. No advance allotments are authorized on supplemental applications for material except where there is a specific request for a specific advance allotment.

5. *Advance Quotas for Other Materials, Including Repair Parts and Operating Supplies.*— The quota authorized on this certificate is to cover orders placed for anticipated delivery in the fourth quarter. All advance orders placed previously for fourth-quarter delivery must now be deducted from the fourth-quarter quotas assigned in column (i), and any orders which can not be covered by these quotas must be cancelled or reduced.

Advance orders for all other materials may be placed for delivery in the three succeeding quarters on the same percentage bases, as indicated for controlled materials in paragraph 4. These advance quotas will be on an order-placing basis to the extent that the records are to be kept and the deductions made at the time when the orders are placed, on the basis of the anticipated deliveries. It is recognized that these deliveries will not be met in all cases, but once the orders are charged against a given quarterly quota, it will not be necessary to make any further adjustment, even though the actual delivery is earlier or later than the anticipated quarter.

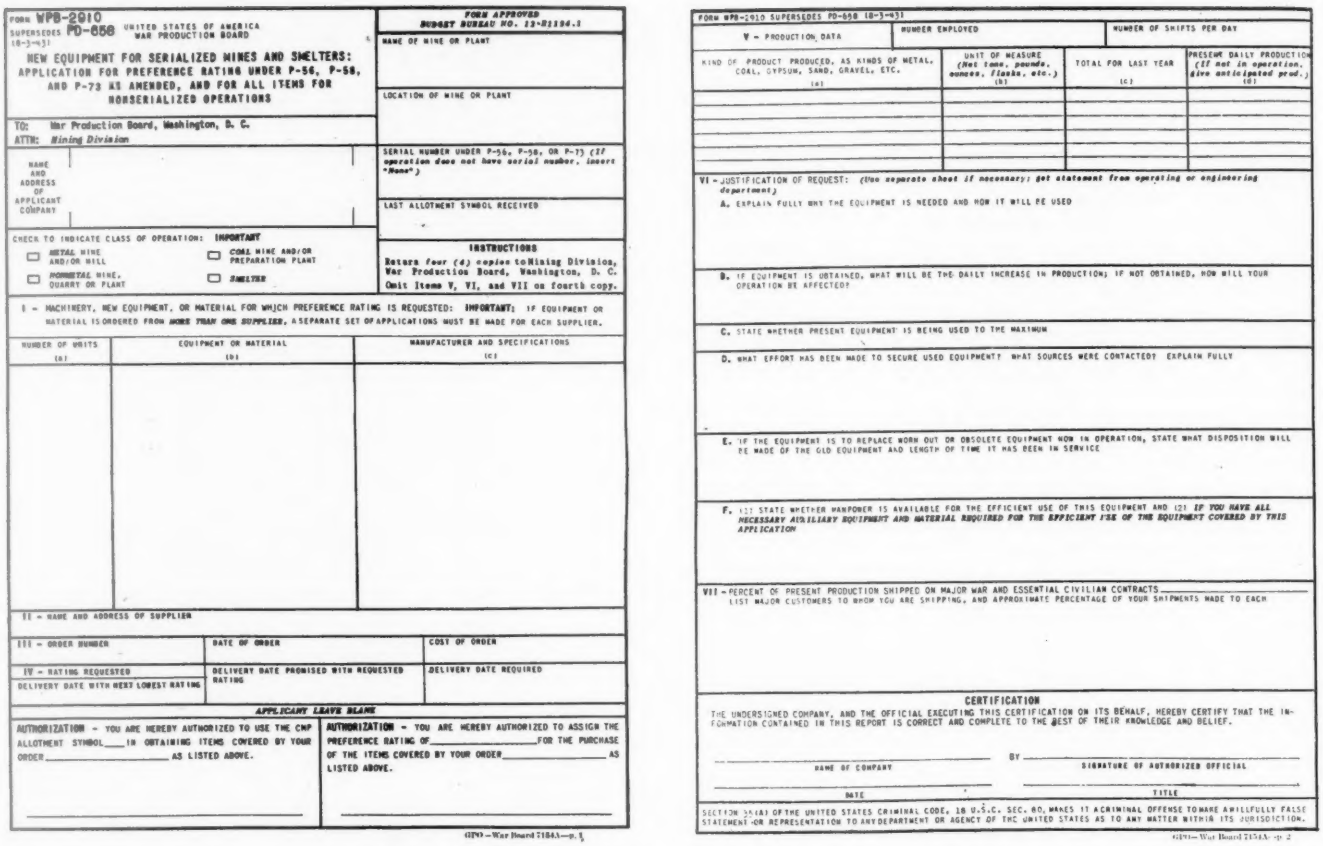
6. *Return of Unused Allotments.—Share the Steel and Copper Program.*—If for any reason it becomes apparent that the allotment of controlled materials assigned on the PD-400 certificate will not be required in the current quarter, you must report the extent of such unused allotments to the Mining Division at the earliest possible date on Form CMP-32. In advising us of unused allotments, it must be *stated specifically* whether or not the advance allotments are also being returned.

7. *Deadline on Supplemental Applications.*— No supplemental applications for fourth-quarter allotments will be processed after December 1, 1943 unless accompanied by a definite statement that the materials requested can be delivered before the end of the fourth quarter.

8. *Re-Rolled Rail.*—We urge you to use re-rolled rail as far as possible in place of new rail. Re-rolled rail is a controlled material deductible from your allotment, but its use will save new rail.

9. *Insulated Copper Wire (Item 29).*—This item is authorized by feet of each size and type. Because of the necessity of arranging the production of insulated wire with the mills, no major shifts in the quantities assigned for each size and type can be made without the permission of the Mining Division, but you may make minor shifts between sizes and types, or order other sizes and types not specifically authorized, within the total copper content of insulated wire, as indicated by the rubber stamp, and not amounting to more than 10% of that quantity. *Advance orders* may be placed *without regard to the sizes and types* authorized for

1. [See PIT AND QUARRY, June 1943, page 51.—ED.]



FORM WPB-2910
SUPERSEDES PD-658 (8-3-43)
UNITED STATES OF AMERICA
WAR PRODUCTION BOARD

FORM APPROVED
BUDGET BUREAU NO. 12-R1194.3

NEW EQUIPMENT FOR SERIALIZED MINES AND SHELTERS: APPLICATION FOR PREFERENCE RATING UNDER P-56, P-58, AND P-73 AS AMENDED, AND FOR ALL ITEMS FOR NONSERIALIZED OPERATIONS

NAME OF MINE OR PLANT

LOCATION OF MINE OR PLANT

TO: War Production Board, Washington, D. C.
ATTN: Mining Division

NAME AND ADDRESS OF APPLICANT COMPANY

SERIAL NUMBER UNDER P-56, P-58, OR P-73 (If operation does not have serial number, insert "None")

LAST ALLOTMENT SYMBOL RECEIVED

CHECK TO INDICATE CLASS OF OPERATION: IMPORTANT
☐ METAL MINE AND/OR MILL
☐ COAL MINE AND/OR PREPARATION PLANT
☐ NONMETAL MINE, QUARRY OR PLANT
☐ SHELTER

INSTRUCTIONS
Return four (4) copies to Mining Division, War Production Board, Washington, D. C. Omit Items V, VI, and VII on fourth copy.

I - MACHINERY, NEW EQUIPMENT, OR MATERIAL FOR WHICH PREFERENCE RATING IS REQUESTED: IMPORTANT: IF EQUIPMENT OR MATERIAL IS ORDERED FROM MORE THAN ONE SUPPLIER, A SEPARATE SET OF APPLICATIONS MUST BE MADE FOR EACH SUPPLIER.

NUMBER OF UNITS (a)	EQUIPMENT OR MATERIAL (b)	MANUFACTURER AND SPECIFICATIONS (c)

II - NAME AND ADDRESS OF SUPPLIER

III - ORDER NUMBER	DATE OF ORDER	COST OF ORDER
IV - RATING REQUESTED	DELIVERY DATE PROMISED WITH REQUESTED RATING	DELIVERY DATE REQUIRED
DELIVERY DATE WITH NEXT LOWEST RATING		

APPLICANT LEAVE BLANK

AUTHORIZATION - YOU ARE HEREBY AUTHORIZED TO USE THE CMP ALLOTMENT SYMBOL ____ IN OBTAINING ITEMS COVERED BY YOUR ORDER _____ AS LISTED ABOVE.

AUTHORIZATION - YOU ARE HEREBY AUTHORIZED TO ASSIGN THE PREFERENCE RATING OF _____ FOR THE PURCHASE OF THE ITEMS COVERED BY YOUR ORDER _____ AS LISTED ABOVE.

GPO—War Board 7184A—p. 1

FORM WPB-2910 SUPERSEDES PD-658 (8-3-43)

V - PRODUCTION DATA

KIND OF PRODUCT PRODUCED, AS KINDS OF METAL, COAL, GYPSUM, SAND, GRAVEL, ETC. (a)	UNIT OF MEASURE (Net tons, pounds, ounces, flasks, etc.) (b)	TOTAL FOR LAST YEAR (c)	PRESENT DAILY PRODUCTION (If not in operation, give anticipated prod.) (d)

NUMBER EMPLOYED

NUMBER OF SHIFTS PER DAY

VI - JUSTIFICATION OF REQUEST: (Use separate sheet if necessary; get statement from operating or engineering department)

A. EXPLAIN FULLY WHY THE EQUIPMENT IS NEEDED AND HOW IT WILL BE USED

B. IF EQUIPMENT IS OBTAINED, WHAT WILL BE THE DAILY INCREASE IN PRODUCTION; IF NOT OBTAINED, HOW WILL YOUR OPERATION BE AFFECTED?

C. STATE WHETHER PRESENT EQUIPMENT IS BEING USED TO THE MAXIMUM

D. WHAT EFFORT HAS BEEN MADE TO SECURE USED EQUIPMENT? WHAT SOURCES WERE CONTACTED? EXPLAIN FULLY

E. IF THE EQUIPMENT IS TO REPLACE WORN OUT OR OBSOLETE EQUIPMENT NOW IN OPERATION, STATE WHAT DISPOSITION WILL BE MADE OF THE OLD EQUIPMENT AND LENGTH OF TIME IT HAS BEEN IN SERVICE

F. (1) STATE WHETHER MANPOWER IS AVAILABLE FOR THE EFFICIENT USE OF THIS EQUIPMENT AND (2) IF YOU HAVE ALL NECESSARY AUXILIARY EQUIPMENT AND MATERIAL REQUIRED FOR THE EFFICIENT USE OF THE EQUIPMENT COVERED BY THIS APPLICATION

VII - PERCENT OF PRESENT PRODUCTION SHIPPED ON MAJOR WAR AND ESSENTIAL CIVILIAN CONTRACTS _____
LIST MAJOR CUSTOMERS TO WHOM YOU ARE SHIPPING, AND APPROXIMATE PERCENTAGE OF YOUR SHIPMENTS MADE TO EACH

CERTIFICATION

THE UNDERSIGNED COMPANY, AND THE OFFICIAL EXECUTING THIS CERTIFICATION ON ITS BEHALF, HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS CORRECT AND COMPLETE TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

NAME OF COMPANY — BY — SIGNATURE OF AUTHORIZED OFFICIAL

DATE — TITLE

SECTION 35(A) OF THE UNITED STATES CRIMINAL CODE, 18 U.S.C. SEC. 80, MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

GPO—War Board 7184A—p. 2

Front and back reproduction (reduced greatly in size) of new Form WPB-2910.

the current quarter, up to the usual percentages of the figure for total copper content.

10. *Lumber* (*Item* 46).—The quota authorized for lumber in column 9, in terms of board feet, sets the upper limit for your purchases of lumber. If ratings higher than the AA-3 are necessary to obtain delivery, the rating assigned on the PD-400 can be applied and the cost deducted from the dollar value of your quota for repair parts and operating supplies (Item 53). The board feet must also be deducted from the lumber quota (Item 46).

11. *Limitation on Use of Ratings.*—Your dollar-value quotas and the rating provided by them must not be used for maintenance, repair, or operating supply items that do not require the application of a rating. As the mines are specifically exempted from CMP Reg. No. 5, no MRO endorsements may be made under that order and no minor items of capital equipment may be endorsed on the PD-400 quotas on the basis of the $500 provision in CMP Reg. No. 5. Endorsements on the PD-400 quotas are defined by the "Definition of Quota Items."

Very truly yours,

A. S. KNOIZEN,
Director of the Mining Division.

WAR PRODUCTION BOARD
Washington, D. C.

DEFINITION OF QUOTA ITEMS
(Revised August 9, 1943)

The procedure to be followed by mine operators for the purchase of maintenance, repair, operating supplies, and new equipment under Preference Rating Order P-56 is outlined below. When questions arise concerning materials other than those listed, you should consult the Mining Division, War Production Board, Temporary Building R, Washington, D. C., or your Regional Technical Advisor.

Before purchase orders are placed, it is necessary for mines holding serial numbers under P-56 to file the proper PD-400 application form (now designated WPB 2937, 2938, or 2939) each quarter to secure an allotment of Controlled Materials, and quotas for other materials. For Controlled Materials (steel, copper, and aluminum) allotments are assigned in terms of weight. For other materials, including repair parts and operating supplies, quotas are assigned in terms of weight, dollar value, or quantity. The following paragraphs explain each part of the quota application and the numbers refer to the corresponding sections on this form.

Part II. *Controlled Materials* (Items 1-37)[2].—The official list of Controlled Materials is printed on the application form under Part II. In addition to the obvious items listed in this section, the following list contains several other items which are considered as Controlled Materials together with the item number under which each should be entered.

Item	*Item Number*
Ball Mill Liners	7 or 19
Crusher Jaws	7
Nails	12
Rod Mill Rods	1b, 14b
Shafting	1
Pipe & Tubing	
Steel	3, 10, 16, 20
Copper	26, 27, 37
Reinforcing Bars	1

Part III. *Other Materials* (Items 38-52).*—Items 38-52 are self-explanatory. Note that forgings are now included under Item 52, and steel mine ties under Item 53, rather than under Controlled Materials.

Item 53. The dollar-value quota under this item includes fabricated repair parts for all types of equipment commonly used in the mining industry, such as *repair parts* for equipment listed below under the heading *New Equipment.* It also includes all ordinary operating supplies for which a preference rating is required, such as:

Batteries (dry-cell)
Belting (transmission only)
Belt dressing
Blasting caps
Bolts and nuts
Canvas bags
Chemicals
Drill bits (detachable)
Ducking
Electric motors, 7½-horsepower or less for replacement only
Electrical repair parts and accessories
Flame safety lamps
Fuse
Hand Tools for mechanics, carpenters, etc.
Nitramon blasting agent
Paints
Picks and shovels
Pipe fittings
Respirators
Rubber products (miscellaneous)
Safety accessories, hard hats, goggles, etc.
Self-rescuers
Screen cloth and jackets
Screen (punched and woven)
Sheaves
Sieve cloths
Transmission and trolley-line accessories
Valves and pipe accessories
Welders' gloves
Welding rod and welding materials
Wire brushes

New Equipment. To obtain any new equipment for replacement, expansion, or development including all types of equipment commonly used in the mining industry, *an application must be made to the Mining Division on the new Form WPB* 2910[3] for a specific preference rating to cover each order. The information requested on this form must be supplied to the mining division on *each* application. Following are a few typical items that are considered new equipment and that require special ratings or authorizations.

Anemometers
Ball-mills
Charging equipment and electric lamps
Classifiers
Compressors
Conveyors
Crushers
Cutting Machines
Detectors, gas
Electric cap lamps
Electric motors (over 7½ horsepower)
Engines
Gas masks
Hoists
Inhalators
Jigs
Loaders
Locomotives
Mine cars and skips
Oxygen breathing apparatus
Pull-wire fuse lighters
Pumps
Rock drills
Rock-dusting machines
Welding equipment

A. S. KNOIZEN,
Director, Mining Division.

NONMETALLIC MINING NOW ESSENTIAL.—The War Manpower Commission on August 17 reissued its list of essential activities, including the amendments that have been made from time to time.

In some cases slight variations in phraseology appear which aid in inter-

[2]Item numbers refer to Fourth Quarter 1943 forms.

[3][Reproduced herewith.—ED.]

preting the list but do not represent any basic change of content. There are no changes except those which have been previously communicated to the industries affected and they have appeared from time to time as amendments to the original list.

Revision of Regulation 4 necessitated relisting in the Federal Register.

Following is the text of the only portions of the list, with additions and material revisions indicated by italic letters.

WAR MANPOWER COMMISSION
[General Order No. 11]
LIST OF ESSENTIAL ACTIVITIES

By virtue of the authority vested in me as Chairman of the War Manpower Commission by Executive Orders Nos. 9139 and 9279, I hereby designate the following activities as essential activities and as included in and constituting the List of Essential Activities.

1. Production of Aircraft and Parts.*
2. Production of Ships, Boats and Parts.*
3. Production of Ordnance and Accessories.*
4. Production of Ammunition.*
5. Agriculture and Commercial Fishing.*

(b) Agricultural Services and Commercial Fishing.*

6. Processing of Food.*
7. Forestry, Logging and Lumbering.*
8. Construction: Highway and street construction; marine construction; construction of approved industrial plants, houses, hospitals, and military projects; repair of such facilities; and services necessary to complete such construction.
9. Coal Mining: The mining of anthracite, bituminous, and semianthracite coal; lignite, and peat, and the operation of breakers or preparation plants. Includes also removing overburden and other such activities preparatory to coal mining operations.
10. Metal Mining.—The mining of iron, copper, *tin*, lead, zinc, aluminum, mercury, manganese, chromium, molybdenum, tungsten, vanadium and similar ores, and the dressing of such ores. Includes also removing overburden, sinking shafts, and other such activities preparatory to metal-mining operations.
11. Nonmetallic Mining and Processing and Quarrying.—The mining, processing or quarrying of salt, *gypsum*, phosphate rock, sulphur, potash, asbestos, graphite pyrites, graphite, borates and other salines, fluorspar, mica, talc, abrasive sands, calcite, and similar essential products.
12. Smelting, Refining and Rolling of Metal.*
13. Production of Metal Shapes and Forgings.*
14. Finishing of Metal Products.*
15. Production of Industrial and Agricultural Equipment.—Power boilers, wiring devices and supplies; agricultural implements; electric lamps; storage and primary batteries; pumps, compressors, and pumping equipment; recording, controlling and measuring instruments and meters; conveyors, industrial cars and trucks; blowers, exhaust and ventilating fans; mechanical power-transmission equipment such as clutches, drives and shafts; mechanical stokers; tools, files, and saws; plumbers' supplies; professional and scientific instruments, photographing apparatus, and optical instruments; and all equipment necessary to operate plants producing essential commodities.
16. Production of Machinery.—Engines and turbines; metal-working machinery and equipment; electrical generating, distribution and industrial apparatus for electric public utility, manufacturing, mining, transportation and construction use, for use in manufactured products or in service industries; construction, mining, agricultural, oil field, smelting and refining machinery, as well as all machinery necessary to produce, equip and maintain aircraft, ships, ordnance, and other military equipment.
17. Production of Chemicals and Allied Products and Essential Derivatives Thereof.*
18. Production of Rubber Products.*
19. Production of Leather Products.*
20. Production of Textiles.*
21. Production of Apparel.*
22. Production of Stone, Clay and Glass Products.—Scientific and industrial glass products; sand-lime, fire-brick and other heat-resisting clay products; *chemical* lime; abrasive wheels, stones, paper, cloth and related products; asbestos products including steam and other packing, pipe and boiler covering; crucibles and retorts; *gypsum board; mineral wool (for insulation)*; porcelain electrical supplies; as parts of military apparatus.
23. Production of Petroleum, Natural-Gas and Petroleum and Coal Products.*
24. Production of Finished Lumber Products.*
25. Production of Transportation Equipment.—The production of motor vehicles such as trucks, ambulances, fire engines, buses, and military motorized units; essential parts and accessories of such motor vehicles; motorcycles, bicycles, and parts; locomotives and parts; railroad and street cars, and equipment.
26. Transportation Services.—Air transportation; line haul railroad; switching and terminal; railway and air express; freight forwarding; rail inspection; *maintenance and repair of railroad equipment, buildings, right-of-way, and rolling stock;* local transit, rapid transit, interurban electric railway, and over-the-road bus; off-shore and intercoastal water transportation, including shore service such as stevedoring and harbor operations; pipe-line transportation; transportation services on the inland waterways, Great Lakes, harbors, bays, sounds, and waters connected with the seas, including shore service such as stevedoring; trucking; warehousing; dry, open and cold storage of essential perishable commodities.
27. Production of Pulp, Paper and Materials for Packing and Shipping Products.*

(b) Production of Other Materials for Shipping and Preserving Essential Products: Bagging, jute, meat; bags, textile (except laundry bags); barrels, metal; baskets (Climax, fruit, vegetable); box shooks; boxes (metal, wooden); cable, fiber; cans; cases, packing; containers (glass, metal, wood; caps and closures for such containers); cooperage; cooperage stock (staves, heading, and hoops); cordage; crates; drums (shipping); excelsior; gummed cloth tape; rope; tin cans.

28. Production of Communication Equipment.*
29. Communication Services.*
30. Heating, Power, Water Supply and Illuminating Services. — Electric light and power, water and gas utilities; steam-heating services; *sewage systems; tree trimming for power and communication lines; water-well drilling.*
31. Repair Services.—Repair of: vehicles, such as bicycles, motorcycles, automobiles, busses, trucks; tires; typewriters and business machines; elevators; shoe repairing; *sewing machines;* radios; refrigerators; clocks and *watches;* harnesses; tools; stoves; pneumatic tube systems; power laundry equipment; electric appliances and motors, engines, heating equipment; scientific, commercial and industrial weighing machines; farm and other industrial and scientific equipment; *welding service;* roofing, and electric, gas, and plumbing and heating installations in domestic, commercial, and industrial buildings; *building alteration, maintenance and repair;* blacksmithing; armature rewinding; locksmithing. It is intended that consideration be given only to individuals qualified to render all-around repair services on the types of equipment specified herein as required for the minimum essential needs of the community.
32. Health and Welfare Services.*
33. Educational Services.*
34. Governmental Services.*
35. Technical, Scientific, and Management Services.—The supplying of technical, scientific and management services to establishments engaged in war production; union-management negotiation services; and the publication of technical and scientific books and journals.

Deletions from the former list are:

Under No. 11, the word "rock" has been deleted before "salt" and the last sentence referring to material used in construction deleted.

*[Full text omitted to save space.—ED.]

USED CONSTRUCTION EQUIPMENT.—The fulfillment of requirements for the defense of the United States has created a shortage in the supply of rubber and other materials used in the production of construction equipment for defense, for private account and for export; and the following order is deemed necessary and appropriate in the public interest and to promote the national defense:

§ 3058.1 *Limitation Order L-196*—(a) *Applicability of priorities regulations.* This order and all transactions affected thereby are subject to all applicable provisions of the priorities regulations of the War Production Board, as amended from time to time, except to the extent that any provision hereof may be inconsistent therewith, in which case the provisions of this order shall govern.

(b) *Inapplicability of this order.* This order shall not apply to the Army, Navy, Maritime Commission or War Shipping Administration. Paragraphs (d) and (e) shall not apply to any person who has acquired used construction equipment for export outside the continental limits of the United States or to any person who is a farmer as defined in this order.

(c) *Definitions.* (1) "Person" means any individual, partnership association, business trust, corporation, governmental corporation or agency, or any organized group of persons, whether incorporated or not, except those excluded by paragraph (b) hereof.

(2) "Construction equipment" means any of those products listed in Schedule A attached hereto and made a part of this order.

(3) "Used" when applied to construction equipment, means any construction equipment which has been delivered to an ultimate consumer.

(4) "Continental limits of the United States" means the forty-eight states of the United States and the District of Columbia.

(5) "Farmer" means a person who engages in farming as a business, by raising crops, livestock, bees or poultry. It also includes a custom operator who uses farm supplies in performing services for farmers. It does not include a person who merely has a "victory garden" or raises food or other agricultural products entirely for his own use.

(d) *Registration of used construction equipment.* Any person owning used construction equipment purchased prior to October 1, 1942, shall on or before October 31, 1942, register such equipment by completing, signing and returning by mail WPB Form 1159 to Used Construction Equipment Regional Specialist in the War Production Board Regional Office in the region in which such equipment is located.

(e) *Registration of change of status of used construction equipment.* Within one week after any used construction equipment (1) is moved from the project on which it is being used; (2) becomes idle after completing its work on that project even if not moved from the project; (3) not being on a project is put into use on a project; or (4) has had its ownership changed, any person owning such equipment shall register such change of status by completing, signing and returning by mail WPB Form 1333 or such other form as may be in the future specified by the War Production Board to Used Construction Equipment Regional Specialist in the War Production Board Regional Office in the region in which such equipment is located.

(f) *Restrictions on exports.* (1) On and after January 16, 1943, no person, other than the Army, Navy, Maritime Commission, War Shipping Administration or their authorized agents, shall export used construction equipment outside the Continental limits of the United States unless specifically authorized by the War Production Board.

(2) Application for permission to export shall be made in quadruplicate on Form PD-556 to the War Production Board, Washington, D. C., Ref.: L-196. Such applications when approved by the War Production Board and returned to the applicant shall constitute an authorization to export.

(3) Nothing in this order shall eliminate the necessity of an applicant obtaining an export license from the Office of Export Control, Board of Economic Warfare where required.

(g) *Records.* All persons affected by this order shall keep and preserve for not less than two (2) years accurate and complete records concerning the movement of used construction equipment from projects.

(h) *Audit and inspection.* All records required to be kept by this order, shall, upon request, be submitted to audit and inspection by duly authorized representatives of the War Production Board.

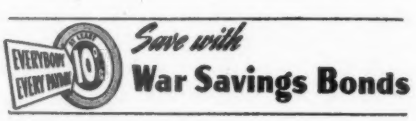
(i) *Violations.* Any person who wilfully violates any provision of this order, or who, in connection with this order, willfully conceals a material fact or furnishes false information to any department or agency of the United States is guilty of a crime and upon conviction may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using material under priority control and may be deprived of priorities assistance.

(j) *Appeal.* Any person affected by this order who considers that compliance therewith would work an exceptional and unreasonable hardship upon him, or that it would result in a serious problem of unemployment in the community, or that compliance with this order would disrupt or impair a program of conversion from non-defense to defense work, may apply for relief by addressing a letter to the War Production Board Regional Office in the region in which the equipment is located setting forth the pertinent facts and the reasons why such person considers that he is entitled to relief. The War Production Board may thereupon take such action, if any, as it deems appropriate by the amendment of this order or otherwise.

(k) *Communications.* All communications concerning this order shall be addressed to Used Construction Equipment Regional Specialist in the War Production Board Regional Office in the region in which the equipment is located.

Issued this 26th day of July, 1943.

WAR PRODUCTION BOARD,
By J. JOSEPH WHELAN,
Recording Secretary.



Save with
War Savings Bonds

1944 Conventions Set for Last Week of January in New York

THE mid-year meeting of the board of directors of the National Sand & Gravel Association, held at the Netherland Plaza Hotel, Cincinnati, on August 19, was unusually well attended because of an agenda that included subjects of pressing importance to producers in the industry.

After listening to a statement by the president, Otto S. Conrades, and approving the financial statement presented and explained by Stanton Walker, director of engineering, the board took action on the questions of the time and place of the 1944 convention. The New Yorker Hotel in New York and the dates January 25 to 27, 1944, were unanimously selected as the place and time. These convention days are Tuesday, Wednesday and Thursday, instead of the customary Wednesday, Thursday and Friday, to allow the convention of the National Ready Mixed Concrete Association to open and close one day later than the gravel convention. It was decided, too, that more time should be given to open-forum discussions and less to outside speakers, thus carrying on a trend that has been noticeable during recent years.

There was an interesting discussion of labor problems related to the functioning of the National War Labor Board and it was the sense of those present that in the case of disputes before local War Labor Boards it is advisable to have the case heard by a tripartite panel, comprising an industry representative, a labor representative and a representative of the public, rather than by an arbitrator or a referee. Acceptance of either of the latter two alternatives commits the applicant to acceptance of the resulting decision without protest or further recourse.

On the question of price control in the sand-and-gravel industry Executive Secretary V. P. Ahearn reported that no Industry Advisory Commitee for the sand-and-gravel industry had yet been appointed by the OPA, although a list of suitable candidates for membership on such a committee had been requested by that agency. Mr. Ahearn said that there had already been two cases in the industry in which price relief had been granted by the OPA on applications by producers.

An interesting experience in connection with wage determination by a referee in the case of some southern California producers was related. Whereas the regulations require that wage determinations be made in the light of sound going rates in the area affected, implying consideration of a range of rates from minima to maxima rather than a single rate, in this case the wage was fixed at what was actually the maximum rate in use instead of at the minimum rate in effect or at an average between the minima and maxima.

At lunch those present were privileged to hear a brief discussion of post-war highway planning by Hal G. Sours, Ohio Director of Highways. The speaker pointed out that if private enterprise can not plan for and give effect to a program for full re-employment after the war the government must step in. Whatever public works are provided for by government should be of the nature of necessities, not alone in the interest of the public but as a support for the morale of the workers employed on them. The average man, said Mr. Sours, does not want to be employed on useless work.

There are three phases of post-war restoration that the country will pass through, in his opinion. First, war-material production will slacken or be stopped and industry will undergo a transition period during which organizations and equipment will be converted to civilian use, and in that period there may be some temporary unemployment. Then will follow a sort of "boom" period in which civilian savings will be spent perhaps lavishly. Finally, we may expect a financial crisis in the nature of a depression unless some means are taken to avoid it.

Mr. Sours then attempted to define the position of highways in these three periods. According to him, states and cities have been and still are falling behind in their attempt to keep abreast of the development of transportation. Many roads become obsolete before they wear out and must be replaced by highways suited to modern traffic needs. There is, also, a great accumulation of deferred highway work.

The road work needed after the war must embrace: (a) the modernizing of our trunk-line system and the replacement of those that are being rapidly destroyed because of the unusually heavy traffic being carried; (b) existing trunk lines must be extended into municipalities and limited access and express routes provided, street-widening alone being insufficient; and (c) expansion of our farm-to-market roads in rural areas.

Mr. Sours thinks that we shall have a greatly expanded road program. The plan of the American Association of State Highway Officials in the form of a bill pending in the Congress would provide an appropriation of $1,000,000,000 annually for three years as federal aid to the states in highway work. Another plan, sponsored by the American Road Builders' Association, seeks an appropriation of $3,000,000,000 per year for three years to include all types of roads, municipal as well as rural. In the past, Mr. Sours pointed out, from 12 to 15 per cent. of our national income has gone into construction work public and private, and about 13,000,000 people have been dependent on construction work directly or indirectly for employment.

With reference to the suggested plans for allocation of federal aid among the states, the speaker said that the highway officials' group has asked for a distribution allocating 50 per cent. on the basis of population, 25 per cent. on the basis of state area, and the remainder on the basis of the mileage of existing roads, instead of the equal three-way division now in effect. He said that densely populated areas have highway needs, so far as cost is concerned, that are exceptionally heavy and too burdensome to be adequately provided for by the present distribution. There has been discussed, but not yet presented to the Congress, a proposal that $250,000,000 be set aside each year for work in municipalities having populations of 10,000 or more in addition to the 50-25-25 division asked for by the highway officials' plan.

Mr. Sours urged that plans be prepared now so that when the war ends there be no delays in making these funds effective. Even though the money is not now available, advantage should be taken of the present time to perfect the general plans so that the details can be worked out as soon as the necessary construction money is appropriated.

Highways should and probably will be the major factor in post-war public works. They have many advantages over other forms of public works because they provide large

(*Continued on page* 113)

"BALING-WIRE" CEMENT PLANT

By E. J. RYAN

another P-Q exclusive

WHY NOT build a cement plant?

We faced the question. We argued with ourselves: cement is scarce. There is not enough cement for restricted local needs. Although we could never—we argued—finance even a moderately large plant, we *could* build a small one—a plant large enough to supply at least a part of the demand in this immediate area around Chihuahua City, Mexico. Freight differentials, we continued to argue with ourselves, would protect us from the large mills; they all are at long distances from Chihuahua City. And the capacities of those other plants are so overtaxed that they can not supply Mexico's rising demands for Portland cement anyway, regardless of freight rates. Therefore, we said, no advertising would be necessary. Orders would flood in even before the plant was in production. Or so we argued.

And all that was true.

Against these factors we acknowledged this: We were hard-rock miners—metal miners. We knew nothing regarding the manufacture of cement. No one could teach us; cement men were, and are, busy elsewhere. But, we said brightly, there are books about cement. So we bought books. We bought every available book concerned, directly or indirectly, with the cement industry.

And we built the plant.

The books hinted at the superiority of the "wet process." That seemed to make sense. We liked that. As miners, in our concentrating and wet-metallurgy plants, we ground wet. We understood wet grinding. Of course we realized that the clinker would have to be ground dry; we marked that off as a necessary, perhaps minor, evil.

So we built a "wet-process" plant.

Our mining company owned a couple of idle ball-mills and a limestone gravel deposit. We took over the mills and the gravel and started from there.

Then we looked for a suitable site. We wanted, of course, to be on a railroad. We finally bought a little "farm" three miles from the center of town but within the city limits (to avoid the necessity of building workmen's houses and a school). The farm has a 300-meter side along the right-of-way of the main El Paso, Texas-Mexico City line of the National Railways of Mexico. How about a siding to service our property? we asked. Easy, they said; just make application. Well . . . but more of that later.

So we set up the two mills and looked for a kiln. And we looked for a means of grinding the clinker. Without priorities of any sort, we combed the continent for a kiln and for mills. We purchased after a long search, a 4½ by 40-foot Vulcan kiln from Niagara, and, from New Jersey, a 4- by 15-foot Allis-Chalmers dry-grinding ball-mill. Both had been used for a long, long time.

We had the kiln. But the kiln had no burner. The W. N. Best Engineering Company of New York, advised us that they could furnish a low-pressure, rotor-cup oil burner, complete with automatic oil heating and pumping unit—*if* we obtained the required priority.

We applied, in our innocence, for a priority. And, in our innocence, we obtained it. And cheerfully we began installing the kiln and the rest of the plant. We built the burner-hood locally, in accordance with the Best Engineering Company's drawings.

We assumed—also very cheerfully

E. J. Ryan

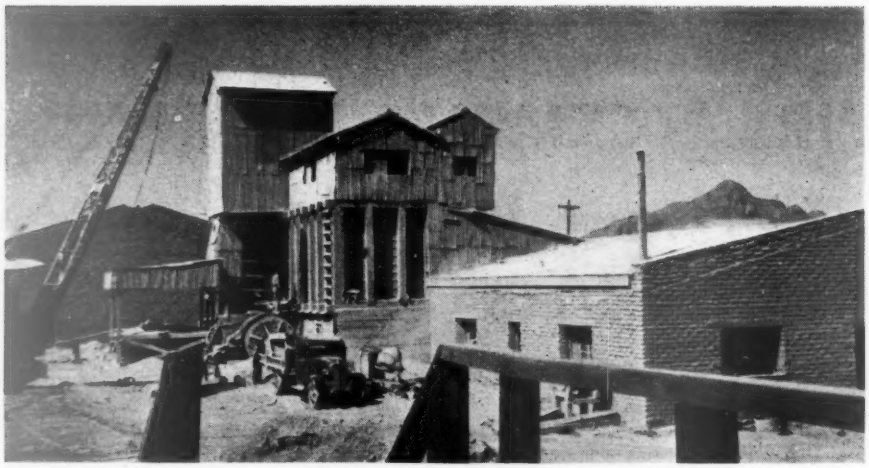
About the author: "I was born in Mexico of American parents in 1906. Graduated from Michigan College of Mines in 1926 as B.S. and Engineer of Mines. Mined in Canada, United States and Mexico, with exception of weird period in New York in 1930-1931 when I decided to show the boys in Wall Street how to do it. (I didn't!)

"At present, manager of Cia. Minera Buenaventura, S.A. de C.V. (mining); Quimet, S. de R.L. (chemical); and Cementos de Chihuahua, S.A. de C.V.

"In my spare hours; and mainly for relaxation, I write fiction. Some of it—but not much—is accepted!"

A view of the plant under construction.

The kiln from discharge end.



Rear view of the mill building.

—that the Allis-Chalmers mill alone would be sufficient for the clinker grinding. We knew that clinker is hard; the books admitted that. But clinker, we told ourselves, could not be very much worse than hard quartz ore.

It seemed so simple.

So our original flow-sheet was simple: Raw material was to be ground wet in a 4- by 5-foot mill and in an 8- by 8-foot mill. Each mill was to discharge into cylindrical concrete storage tanks. Pulp, we tried to remember to call it "slurry," from those tanks was to be transferred by Wilfley pumps to a concrete mixing and storage tank. From the storage tank the slurry was to be pumped, at about 80 per cent. minus-200-mesh and 71 per cent. solids, to a Ferris wheel feeder above the kiln. Clinker was to be removed through a 14-inch by 40-foot rotary cooler (made here out of well-casing) into a hopper, thence by truck to outdoor storage. Seasoned clinker was to be hauled by truck to a jaw crusher, and from the crusher to the Allis-Chalmer's mill feed-bin by bucket-elevator. Cement was to be raised by another bucket-elevator to the bin above the packing machine. (We were unable to obtain an orthodox packing machine; so we made one. It's one home-made gadget that really works! It's much simpler than the machines that are, or used to be, on the market. There are no moving parts.)

That was our flow-sheet on paper. And we actually followed it. So we were all ready, we thought, when the burner equipment arrived eight months later. We snapped the burner into place and started "cooking."

But we only started.

We never could get much beyond a start, because we discovered something that the books forgot to mention: the "wet process" is impossible in a 40-foot kiln. The slurry does not dry gradually as it rolls gently down the kiln into the calcining zone, as it is sketched so prettily in the books. In a 40-foot kiln the exit gases are *hot*. The water of the entering slurry almost explodes into steam, and the suspended solids are baked into a hard plaster on the kiln walls. A plaster that builds into a hard ring impedes the downward flow of the charge and, eventually, closes the kiln. And the slurry pours back into the dust box.

We tried desperately to prevent the formation of that ring at the feed end of the kiln. We hung chain curtains. Chains may be useful, in long wet kilns, to assist in the transfer of heat from the gases to the slurry. But in a short kiln they are of no use in breaking rings of hard-baked feed. The chains simply become embedded. Then we tried rigid "scraping rails," fixed while the kiln revolved. They only softened in the heat and bent into odd shapes and gouged the kiln lining.

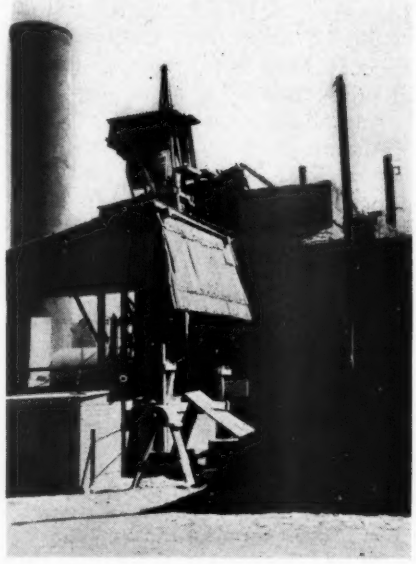
So we started all over again. We went "dry." We took from an affiliated chemical company a Vulcan 2- by 20-foot experimental kiln, complete with hood and Rockwell oil burner. We set up this little kiln as a drier, on a 1¼-inch-to-the-foot slope. We filled in the slurry tanks and tore out the Wilfley pumps. From the "big" kiln we removed the Ferris-wheel feeder and installed a screw feeder of our own making for dry material. And we changed our flow-sheet. . . .

Our gravel deposit contains several million tons. We have shipped several thousand tons of this material to the local lead-smelter as flux. These shipments were "mined" from various parts of the gravel bank, and thus formed a fairly representative sample of the entire deposit. Gravel material that passes through a ⅜-inch screen averages rather steadily: 46 per cent. CaO, 12 per cent. SiO_2, 4 per cent. Al_2O_3, 1 per cent. Fe_2O_3, 0.3 per cent. MgO. The plus ⅜-inch material is higher in lime; nice for the smelter.

And those "fines," mixed with granulated smelter slag, give us our raw materials as ball-mill feed. We need no primary crushing.

The limestone "fines" are shipped to the plant over a distance of 20 miles on the main line of the National Railways of Mexico. The freight rates are remarkably low. Our siding was originally planned to go through our yards. But some one discovered that it was against all rules to run a siding off a main line out of the railroad right-of-way. So they built for us a nice, long siding within the right-of-way, outside our plant walls. We were informed that we could run a spur off the siding into our yards whenever we wished. We wished to do that then, and still do; but have you tried to buy any railroad steel lately, new or used?(!)

So raw materials are picked up from the siding edge by trucks. The trucks transport these materials to



Hopper and feed mechanism for kiln.

the hopper of the drier. The rock, or slag, is lifted from the hopper bottom by a bucket-elevator and enters the drier by gravity. Dry material is discharged through a 14-inch by 19-foot rotary cooler to a bin, from which the coarse, dry, relatively cool charge is moved by truck to the "bedding" house before going to storage or to the feeder bin of the raw primary mill.

The little drier can handle as much as 3 metric tons per hour.

The two raw mills were converted

to dry grinding. Material from the drier—slag and limestone gravel—is bedded much as is done in smelter practice. A layer of gravel is spread; over this is sprinkled uniformly the requisite amount of slag. Then a successive layer of gravel is spread over the slag, and the operation continued until the entire feed pile reaches a height of about 3 feet. In transferring to the bins this flat pile is picked up, evenly, from the bottom.

The mixed charge is then fed to the primary raw mill. The mill discharge is checked for analysis, and correction is made, if needed, by the addition of pre-ground slag or limestone before the charge enters the fine-grinding raw mill. The discharge of this last mill fluctuates between 75 and 85 per cent. minus 200-mesh. (We wish clinker were as easy to grind!)

Trucks again are employed to move this fine feed to the hopper of the kiln feeder. About this feeder: we wanted to drive it with a variable-speed motor. Such a motor was not obtainable. So we utilized a constant-speed motor, connected to the feeder through a standard automobile transmission. That, at least, gives us three distinct rates of feed: low, second, and high. (We removed the reverse gear!)

Clinker now falls on a shaking, inclined slide inclosed in a brick tunnel. Our well-casing cooler did not work. We could not line it; so it would become red-hot after a couple of hours—red-hot and soft. We substituted a brick-bottomed tray, 3 feet wide and 16 feet long, motivated by the discarded head-motion of a Wilfley concentrating table. The clinker emerges cool enough to handle in trucks, and the heated air is carried through the tunnel to the opening in the burner-hood bottom, where it enters the kiln as pre-heated secondary air.

Siding on main line of National Railways of Mexico.

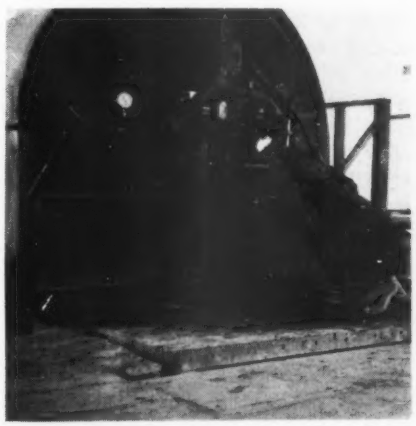
General samples are taken from each 24-hour run of clinker, and pats are made from the samples. If the pats fail on the "steam test", the corresponding clinker is piled in the open to season. Sound clinker is taken immediately to the jaw crusher, where the required amount of gypsum is added. Mixture of the sulphate and clinker is obtained by "bedding" before crushing. Gypsum arrives at the plant, from a local deposit, in lumps. Two to three per cent. will bring the initial and final setting time to within the limits set by the A. S. T. M.

We've learned about clinker, and we smile humbly and sadly at the memory of our early comparisons. To think that we used to consider quartz as hard! But we've learned, and we are installing two additional mills and a set of rolls. All three machines have been used, but they are in fair condition and will aid us greatly. At present, and until the "new" mills are installed, we grind the clinker in batches—three times through that Allis-Chalmer's mill! A vertical bucket-elevator returns the mill discharge to the feed bin on the original and second passes. On the third pass a chute is diverted so that the material enters the packing bin. We have not as yet attempted air classification. The "books" have arguments against it, and, anyway, where could we get the equipment at present?

So our production is decidedly limited.

The kiln can—and does—produce 1½ to 1¾ metric tons of rather hard-burned clinker per hour. But the grinding is our bottleneck—grinding and power.

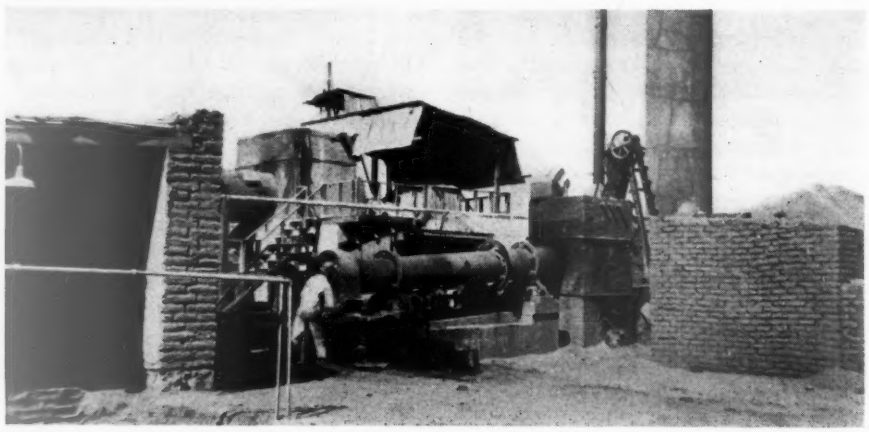
We have found that our short kiln necessitates rather hard burning of the clinker to produce a sound cement. Even on "low-lime" feed, a high flame temperature is required for the complete combination of the lime. The reaction time is so limited in a short kiln that soft or even "normal" burning allows the escape of uncombined lime. (This could be off-set largely, of course, by increasing the grind of our raw materials to 90 per cent. minus-200-mesh or better. But again we are confronted by the inadequacy of our grinding equipment.)



The kiln hood and burner.

Another mill-building view showing adobe construction.

We could burn softer, and allow the clinker to season sound. But that requires time. And our financial position at present will not allow the freezing of funds in large clinker stock piles. So we practice hard burning, (which unavoidably boomerangs against us again in our clinker grinding) and carry the cement ratio of the raw feed as low as possible and still conform to tensile-strength requirements in the finished cement. And we keep the iron content of our charge as high as possible; it acts as a flux in the promotion of a more rapid combination of lime with silica and alumina. The iron seems to reduce the required reaction temperature. And at a given high temperature the reaction is quicker. This high-iron cement is dark in color, but no one seems to care.

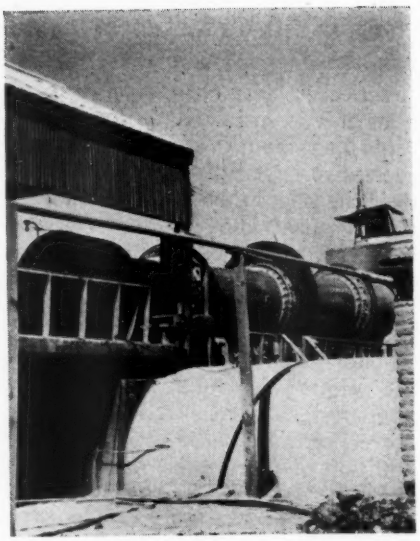


This view shows the rotary drier.

About kiln lining: we obtained, at the very beginning, sufficient alumina brick (Arco 70) for our clinker zone. But we wrecked it during our frantic struggles with the "wet proccess". Alumina brick, now, is about as difficult to obtain down here as is a new set of automobile tires up there in the States. So we use a local construction brick. Strangely, it does fairly well. It is a high silica, low-iron brick, not hard-pressed. The preliminary flame temperature is carried at a slight excess while rolling the charge down over new brick. The high iron content of the charge under the excess heat produces a sticky clinker that coats the brick with a skin that remains firm and stable even with considerable cooling. We tried clinker brick only once; it is much too expensive. We obtain the building brick for two centavos (0.4 cent U. S. currency) each, delivered at the plant. They last, in the clinker zone, six to eight weeks. In the remainder of the kiln they seem to last indefinitely.

Fuel oil is stored in semi-underground concrete tanks easily filled from railroad tank-cars. The oil is heavy, 12 degrees Baumé. It is pumped from the tanks (two, each with a capacity of 150,000 liters) to the Best Engineering heating unit. The oil leaves the heater at 190 degrees F., which is maximum for the unit. We found that the oil required additional heat for good atomization. So we pass it also through a small covered coil in the kiln dust box, and it reaches the burner at about 210 degrees F. The oil is Mexican, and has, we are told, a higher B.t.u. value than do the general run of American oils.

The kiln stack was constructed of concrete, brick-lined. It has an effective height of 47 feet and an internal diameter of 4 feet. The same stack also is utilized, on occasion, for a 100-horsepower, oil-fired boiler which serves as a source of auxiliary power; stand-by steam engines are used to supplement two of the several internal-combustion engines which serve the bulk of the plant's power requirements. The boiler is a gas-tube boiler and therefore is of no use in utilizing waste kiln heat. Kiln dust chokes the flues within a very few hours. We are considering the installation—at some future time, and if we can ever find one—of a water-tube boiler. A lot of heat passes out of that 40-foot kiln.



View showing kiln and cooler tunnel.

Lack of sufficient electric power is, at present, another of our serious problems. Electricity is supplied to this district from a hydroelectric plant 90 miles south of this city. The generators and, particularly, transformers already are overloaded. Consequently, we were able to obtain only sufficient electric power to operate the kilns, burner motors, oil-pump motors, and for plant lighting.

The rest of our plant power is derived from semi-Diesel and kerosene engines, either through direct flat-belt drives or through line-shafts. One of the engines is connected through a line-shaft to a direct-current generator which supplies sufficient electricity to enable us to use the comparative flexibility of direct-current motors on our coolers, feeders, etc.

And we have a great deal of trouble. (*Continued on page* 65)

One corner of the mill building.

Conveyor System Carries Cement Rock, Shale from Quarry Crushers to Plant

WHEN the National Cement Company decided to abandon the quarry 3½ miles from its plant at Ragland, Alabama, which it had operated for many years, for another one only a mile from the plant it was also decided to abandon the rail-haulage system. A new belt-conveyor system was installed for this purpose which is probably unique in the cement industry. In six sections this conveyor system carries the stone and shale more than a mile from this quarry to the storage department at the cement plant over rolling terrain and numerous natural and man-made obstacles. This conveyor system has a capacity of slightly over 200 tons per hour and is carrying this material at the lowest ton-mile cost in the company's history.

By W. E. TRAUFFER

The transition from one method to the other was accomplished in stages and without interruption to the production of cement. Now the primary and secondary crushers are both on the floor of the quarry and the crushed stone and shale are delivered to the plant by the belt-conveyor system.

The first steps in this conversion were taken and the necessary new equipment ordered before Pearl Harbor and the construction work was done by a small group of company maintenance workers aided at odd times by other employees. The Continental Gin Company, which supplied the entire conveyor system complete with drives, motors, etc., made the necessary topographical survey and maps and designed the conveyor system, the concrete piers supporting it, and other concrete structures involved.

Secondary crusher in quarry and feed end of conveyor system. Truck is dumping to secondary crusher. Primary crusher had not been installed when this picture was taken.

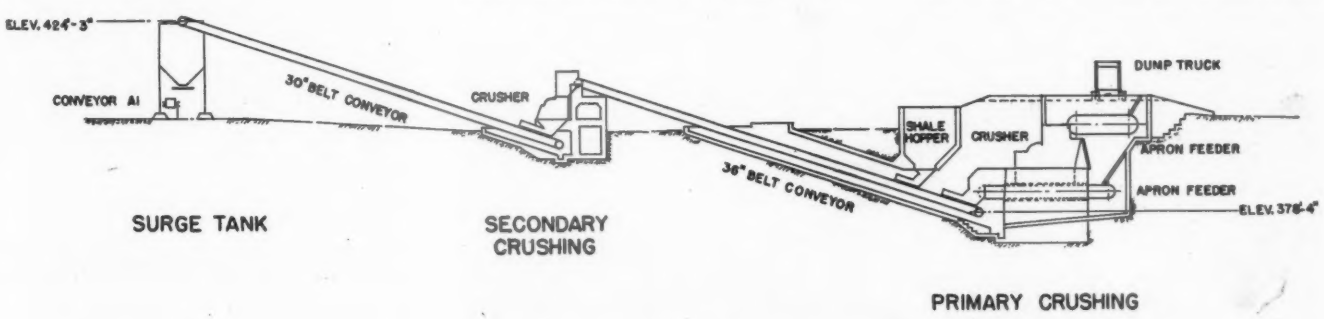
The quarry is ideal for cement manufacture because it contains not only suitable limestone but also the silica and alumina shales. The limestone deposit lies on a 30-degree slope in thick strata which are somewhat broken up near the surface where they were at one time eroded to form pockets. There are no clay seams extending into the deposit. The overburden average 8 feet in thickness and is removed by a Caterpillar tractor and LeTourneau Carryall scraper. An International Diesel tractor with a Bucyrus-Erie bulldozer is used for general purposes in and about the quarry and also pushes some of the silica-shale overburden over the edge of the quarry so that it can be loaded to the conveying system.

The alumina-shale deposit abuts on the limestone in the quarry and this material is also loaded separately to the conveyor system.

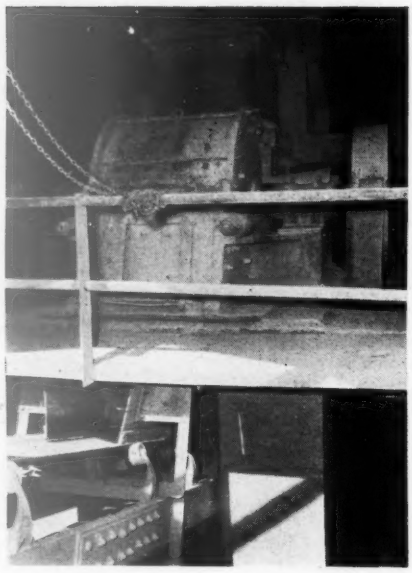
The rock face now averages about 55 feet in height and an area of about 60 acres will be worked out at the present level before going deeper.

Two 6-inch well drills—a Sanderson and an Armstrong—are used for primary drilling. The sizes of the shots made depend on conditions and range from 12 to 50 holes in from one to four rows. After the face is worked farther from the crusher buildings larger shots will be the rule. Du Pont 60-per cent. gelatin dynamite is used for both primary and secondary shooting. The necessary secondary drilling is done with jackhammers. A wagon drill is used on the alumina-shale deposit and small shots are made which bring down 400 to 500 tons each.

The stone is loaded by two Marion 37 steam shovels with 1¾-cubic yard dippers into three Hug trucks with 8-cubic yard Boulder Dam-type end-dump bodies. These discharge the stone on a 4½- by 18-foot apron feeder which insures an even feed into a 42- by 48-inch Allis-Chalmers Superior primary jaw crusher. A stone hook over this crusher is operated by an air cylinder. A 3- by 25-foot pan feeder catches the waste from the first feeder and discharges



Sectional elevation of installation in quarry.



The hammer-mill secondary crusher.

it, with the minus-6-inch primary crusher product, on a 36-inch by 102-foot inclined belt-conveyor. This in turn discharges all of the rock into the Dixie Mogul hammer-mill secondary crusher. The minus-1½-inch product of this crusher is discharged on a 30-inch by 95½-foot inclined belt conveyor from which it is discharged into a 60-ton circular steel tank at the foot of the incline from the quarry.

A revolving feeder with an adjustable scraper blade feeds the stone from this tank at the desired rate, now about 200 tons per hour, on belt conveyor A which is the first of the series of 24-inch conveyors to the plant. Conveyor A is 500 feet long on centers and carries the stone about half way up the incline from the quarry with a rise of 49 feet 10 inches in that distance. Conveyor A-1 is identical in every way and extends to ground level at the end of the incline. Conveyor B has a rise of 17¼-feet in its 1,190-foot length and passes under a county highway through a concrete underpass. Conveyor C has a total rise of 38⅓ feet in its 960-foot length. Conveyor D has a 4¾-foot rise in its 1,110-foot length. This conveyor traverses the roughest topography of any and in one place a cut 15 feet deep was made through a hill. Otherwise the conveyor system follows the ground contours fairly closely and there are few cuts or fills of any consequence. Conveyor E has a 11¾-foot rise in 1,092-feet and extends into the raw-material storage building at the plant. All of the conveyors are now covered with second-hand corrugated sheet metal and the transfer stations housing their drives are similarly inclosed.

In building this conveyor system considerable ingenuity was exercised to avoid the use of new materials important to the war effort. Perhaps the most interesting feature is the use of steel conveyor trusses made from old roof trusses taken from a dismantled building. These trusses are 15½ feet long and are used in pairs with cross-connecting bars of old reinforcing rods welded to them. One such completed truss was tested and safely held a load of 11 tons at its center—far more than it will ever have to hold in actual service.

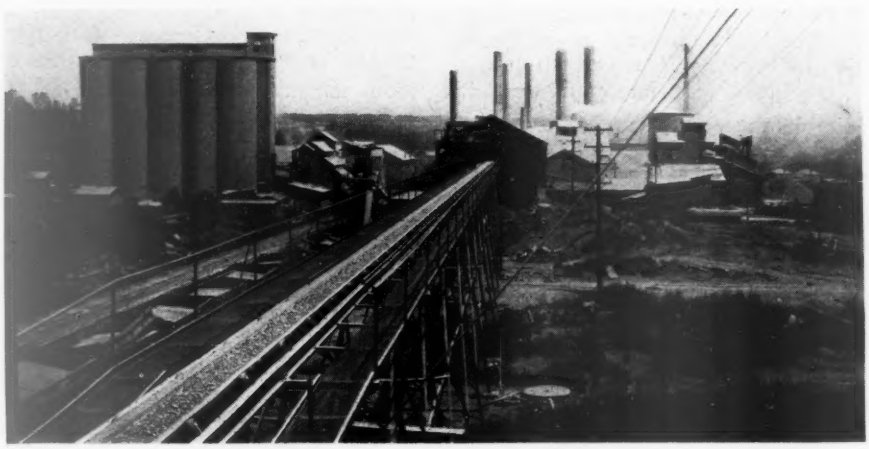
Another feature is the type of transfer hopper used between conveyors. Instead of using a specially-fabricated hopper at each junction to fit the angles between the various conveyors it was decided to use a circular hopper which would fit all angles.

The carrying idlers are all of the 3-roll type with 5-inch-diameter rolls which are separately removable and interchangeable. They are equipped with Timken roller-bearings and metal labyrinth grease seals. Alemite button-head type grease fittings are used with pipes to the center and far pulleys so that all of the greasing can be done safely from one side while the conveyors are in operation.

Each of the conveyors in the main system—A, A1, B, C, D, and E—is driven by a 25-horsepower, 1,760 r.p.m., 440-volt, 3-phase, 60-cycle General Electric Type KG splash-proof motor through a Foote Brothers 75 DX helical gear reducer with a ratio of 14.2 to 1. These conveyors are all driven at a speed of 300 feet per minute. They are all equipped with lagged conveyor pulleys and silent-pawl holdbacks. These drives and motors are interchangeable which makes it necessary to maintain only a small stock of replacement parts.

The two conveyors in the quarry have the same types of idlers, pulleys, drives, etc., but are driven by 20-horsepower, 1,750 r.p.m., 220/400 volt, General Electric ball-bearing, splash-proof motors. The conveyor from the primary to the secondary crusher is driven at a speed of 150 feet per minute and the one from the secondary crusher to the foot of the incline at a speed of 200 feet per minute. All of the conveyors are driven at their head ends and have horizontal gravity takeups.

Conveyor B passing under highway through concrete underpass.



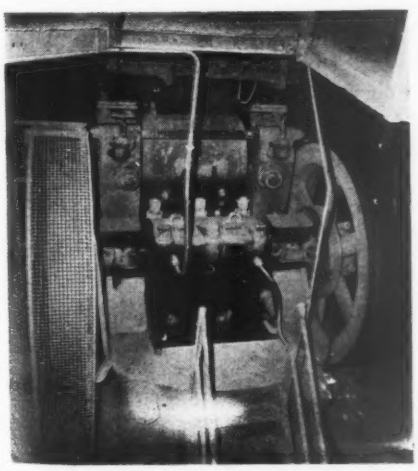
Final conveyor to storage department at plant.

This view shows type of concrete piers and steel trusses used.

All conveyor belting is United States Rubber Company "Super-Amazon" brand, 24-inch stock.

A Jeffrey traveling tripper is used to discharge stone and shale into the covered storage and also to discharge stone on an outdoor pile from which it is at present reclaimed by means of a tractor and bulldozer. Later the storage building and the tunnel-reclaiming conveyor under it will be extended to include this pile. A 3-cubic yard Sauerman Crescent scraper system is now used to provide about 37,000 tons of additional outdoor storage capacity.

The stone is reclaimed from the covered storage on a tunnel belt-conveyor which also receives the necessary amounts of shale, sand, and iron ore from separate tanks. The proportions are controlled by gates in the tunnel under the stone and by table feeders under each tank. Each tank is also provided with electric vibrators to insure a free and steady flow of material. The sand is received in trucks and the ore in cars and a bucket elevator discharges them into their respective tanks.



The 42- by 48-inch jaw-crusher with feeder above.

The tunnel blending conveyor feeds to a bucket elevator which discharges the blended raw mix into two 60-foot rotary driers, one 5 feet and the other 6 feet in diameter. The dried mixture is carried on a belt-conveyor to a pair of Bradley Hercules mills used for preliminary raw grinding. Final raw grinding is done by a pair of tube mills which are in closed circuit with a Williams air separator. The finished raw material goes to an 8-inch Fuller Kinyon pump which can feed it either direct to the feed bins of the five rotary kilns or into three blending silos ahead of them.

The National Cement Company bought this plant in 1920 and in the intervening years has made many improvements to it. The dry process is used and the five 125-foot rotary kilns give the plant a capacity of 1,500,000 barrels of cement annually.

Mexican Plant (from page 62)

The engines do nobly, while they work. But they work only a part of the time. Usually they are undergoing repairs. The engines were acquired locally, second- (or even third- or fourth-) hand. But relief is in the offing; one of the large near-by mines has exhausted its ore-bodies and is releasing electric power for use elsewhere. We have made application for enough of this to electrify completely our little plant. We expect to be operating through switch-boards, rather than spark plugs, within the next few weeks—by early May, possibly. (As an interesting sidelight: all our ancient internal-combustion engines already have been "spoken for." Local ranchers want them for irrigation pumping. Engines, like cement, are scarce.)

As can be seen from the accompanying pictures, all the plant building construction is of *adobe,* the logical and accepted building material in Mexico for walls, etc. Our plant walls are not as yet plastered. Plaster on fresh *adobe* tends to crack as the walls settle. It is customary to allow the *adobe* to age for about a year and then to plaster it. (Lately, much residential construction has been done with *adobes* set in cement mortar rather than mud and the plaster is spread immediately over chicken-wire reinforcing fastened against the wall.)

The plant roofing is of corrugated paper. Galvanized, corrugated iron was, and is, almost impossible to obtain.

So there is our baby plant. We've learned, and are continuing to learn, the hardest, most expensive way. But we are beginning to like it—to like the cement business, that is, not the hard way of learning.

We've had a hard time. We still are having hard times and will continue to have them. But we are going to keep trying. The market is here. There is a need for cement. Mexico is building new highways, important highways, and other important things—things that are connected, directly or indirectly, with the war effort of the United Nations.

And the people here are for us. They hope for our eventual success.

What more could we ask?

Sentinels of Safety Trophies Awarded

Trophies, known as the "Sentinels of safety," have been awarded to six mining and quarrying companies for outstanding records in preventing accidents during 1942, it was announced by Dr. R. R. Sayers, director of the Bureau of Mines.

Donated annually by the *Explosives Engineer* magazine, the trophies are given to each of the leaders in underground bituminous coal mining, underground anthracite mining in Pennsylvania, underground metal mining, underground nonmetallic-mineral mining, open-cut mining of all types, and stone quarrying.

The Ironton cement-rock mine at Ironton, Ohio, won the non-metallic-mineral-mine group trophy. This mine was operated by the Alpha Portland Cement Company for 113,841 man-hours during 1942 without a lost-time accident.

The trophy for the quarry group was won by the Hanover quarry, operated by the Bethlehem Steel Company, near Hanover, Pennsylvania. This quarry was in operation 213,800 man-hours without a lost-time accident.

This Plant Produced the Aggregates for Two Island Air Bases

To-day, when Uncle Sam's "war birds" want a landing place, they want it in a hurry. There isn't time for a survey or finished detail plans. They just go ahead and build it and get it operating. Some unbelievable records have been set for speed and performance on these jobs.

One of the main problems is the production of suitable aggregate to be used for paving the runways and aprons and for concrete construction. Seldom is there any commercial aggregate plant with sufficient capacity to furnish the required materials.

In most cases, they have to use the material nearest to the site. There isn't time to make complete studies to determine either quality or quantity.

To help solve their problems, the Pioneer Engineering Works of Minneapolis, has designed several complete aggregate plants. These plants are flexible so they will operate in gravel or quarry work, they can be used dry or for washing, and they will produce two, three, or four sizes, including sand.

The No. 455 crushing and washing plant shown here is typical of this type of plant. It is designed to be semi-portable. The main units are mounted on heavy skids so they can be easily moved into position on their foundations. The conveyors are all steel frames, made up of welded side frames and bolted knock-down construction. Diesel power units provide ample economical power at any location. Steel bolted bins, which are easily set up, support the screening and washing equipment.

The plant shown has produced all the aggregate on two Atlantic air bases on widely separated islands. Because of the portable design and steel construction, it can be quickly knocked down, moved and set up on the next job.

The plant consists of a 40-inch by 10-foot traveling grizzly feeder, which by-passes the fines and controls the feed to a 30- by 42-inch primary jaw crusher. A 30-inch by 155-foot belt conveyor carries the aggregate to a 4 by 16-foot vibrating screen. The material is washed and the sand and water pass into a paddle-type dehydrator. Four steel storage bins receive the finished aggregates. Oversize is discharged from the top deck of screen to a Pioneer 54- by 24-inch roll crusher. Final crushing is performed in a 40- by 22-inch roll crusher.

If no sand is available, "stone sand" can be produced in this final roll crusher. A return belt-conveyor carries the crusher product from the rolls to the feeder conveyor and thus back to the screen.

Four Caterpillar Diesel power units are used—one on the primary crusher, one on each of the roll crushers, and one for the screen, dehydrator, and conveyor. Multiple V-belts transmit the power to the crushers.

The entire plant is anti-friction bearing equipped. SKF bearings are used on the jaw crusher and vibrating screen and Timken bearings on the roll crushers and conveyor idlers.

Memphis Producer Dies in Highway Accident

W. E. Gamewell, 65, vice-president of the Memphis Stone & Gravel Company, Memphis, Tennessee, was fatally injured when struck by an automobile July 16 about five miles west of Dyer, Tennessee.

W. L. Smith, president of the firm, who was traveling with Mr. Gamewell, said they had planned to spend the night in Dyersburg and had stopped to fix a puncture. Mr. Smith and R. S. Smith, superintendent, were jacking up the car when another car, driven by a soldier, struck Mr. Gamewell who was standing in front of his automobile. Mr. Gamewell was pronounced dead on arrival at a doctor's office in Dyer, where a passing motorist carried him.

Born in Murfreesboro, Tennessee, Mr. Gamewell had been vice president of the quarry company for 15 years.

Louisville Stockholders Get 50-Cent Dividend

The board of directors of the Louisville Cement Company has voted a dividend of 50 cents a share on outstanding common stock. Distribution was made August 1 to stockholders of record July 27.

The Effect of Added Materials on Properties of Portland Cement

By G. L. KALOUSEK
National Bureau of Standards

A COMPREHENSIVE series of investigations has been completed at the National Bureau of Standards showing the effects of various added materials on the properties of Portland cement clinker pastes. The data on the chemical composition and physical properties of the aqueous extracts from these pastes have been published recently [1].[1] An earlier report [2] on a portion of these data dealt with correlations between the potash and sulphate contents of the clinkers and extracts and indicated the presence of potassium sulphate in a number of the clinkers. The third report [3] of this series showed the effects of the added materials on the strengths, heats of hydration and other properties of the hydrating cement clinkers. Since it was felt that a resume of the results of this series of studies would be desired by many, the present summary was accordingly prepared.

Materials and Procedure The twelve clinkers used in the investigation were chosen to give a wide range in soda (0.02 to 0.87 per cent.) and potash (0.05 to 1.32 per cent.) contents. The added materials and the percentages of these by weight of clinker were as follows:

Gypsum	3.90	per cent.
Calcium chloride	1.46	" "
Calcium acetate	1.35	" "
Fluosilicic acid	0.33	" "
Sucrose	.05	" "
T D A	.03	" "
Tannic acid	.20	" "
Triethanolamine	.10	" "

Gypsum was ground in with the clinker as was also the TDA. The latter was added as an aqueous solution of 1 part of TDA to 7 parts of water. Each of the other materials was dissolved in the mixing water.

A batch of cement clinker and water, with or without the added material (C/W = 2.86 by weight), was mixed for 2½ minutes. The liquid was then removed from the resulting paste by means of a pressure filter. A companion mixture was set aside for 1 hour and 55 minutes before being filtered. The two extracts are referred to as having been obtained at 7 minutes and 2 hours, respectively. The extracts were analyzed for Na_2O, K_2O, CaO, SiO_2, SO_3, MgO, the R_2O_3 group, and basicity. The pH, density, conductivity and surface tension of the extracts were measured with calibrated apparatus.

Heats of hydration at 7 and 28 days were determined by the heat-of-solution method on samples of the pastes before and after filtration at both 7 minutes and 2 hours. Heats of hydration at ½ and 1 day were estimated by integrating temperature-time curves. These curves were obtained by measuring continuously, for 24 or more hours, the temperatures of freshly prepared cement clinker pastes stored in Thermos jars.

Portions of the pastes after filtration at 7 minutes and 2 hours were used for preparing strength specimens. Briquets and 2-inch cubes were made from a 1:3 cement—standard Ottawa sand mix with a C/W ratio of 2.40 by weight. Two-inch cubes were also made from a 1:3½:3½ cement — fine testing sand—small aggregate mix, with a C/W ratio of 1.25 by weight. All the specimens were stored in water until tested at 1, 3, 7 and 28 days.

The other properties investigated were the flows of concrete mixes at ½ hour and 2½ hours after the original mixing of the cement clinker and water, the sugar solubility according to Merriman's method, and the amounts of floc developed according to Paul's test. Also, the conditions of the pastes with regard to quick setting, stiffening, etc., were recorded.

Extracts of Aqueous Compositions The compositions of the filtrates from pastes without added materials are given in Figure 1. In the following paragraphs the variations in the compositions of these extracts will be summarized first and the alterations caused by the presence of added materials in the pastes will then be pointed out.

The basicity, which represents the total OH-concentration of the three bases, $Ca(OH)_2$, NaOH and KOH, ranged from 0.06 to 0.25 equivalent weight per liter at 7 minutes and from 0.06 to 0.36 equivalent liter at 2 hours.

The concentration of K_2O varied from <0.1 to 18.6 grams per liter at 7 minutes and that of Na_2O from 0.1 to 3.0 grams per liter. An examination of Figure 1 shows that, in the majority of extracts, larger amounts of Na_2O and K_2O dissolved during the first 7 minutes than during the interval between 7 minutes and 2 hours. Computations indicated that 1 to 58 per cent. of the total K_2O and 1 to 30 of the Na_2O were extracted in 7 minutes. The percentage extractions in 2 hours were 6 to 62 per cent. of K_2O and 4 to 34 per cent. of Na_2O. The large extractions of K_2O from the 5 clinkers richest in K_2O were attributed to the presence of K_2SO_4 [1].

The CaO contents of the filtrates ranged from 0.1 to 1.7 grams per liter at 7 minutes and were not much changed at 2 hours. A plot of the CaO concentrations against basicities for both 7-minute and 2-hour filtrates showed a trend which paralleled the reported [4] solubility curves for $Ca(OH)_2$ in solutions of KOH and NaOH. Nearly all the filtrates were supersaturated with respect to $Ca(OH)_2$.

The concentration of SO_3 at 7 minutes ranged from 0.0 to 7.9 grams per liter. The three filtrates containing significant amounts of SO_3 showed decreases in its concentration between 7 minutes and 2 hours.

The SiO_2 contents of the extracts were generally below 0.005 grams per liter except in the extracts containing the lower amounts of CaO. The highest concentration was 0.029 gram per liter.

The amounts of R_2O_3 ($Al_2O_3 + Fe_2O_3$) in solution were generally smaller than 0.01 gram per liter. However, a few of the filtrates contained small quantities of Cr_2O_3 and this accounts for the higher values of R_2O_3 shown in Figure 1.

[1] Figures in brackets indicate literature references at the end of this paper.

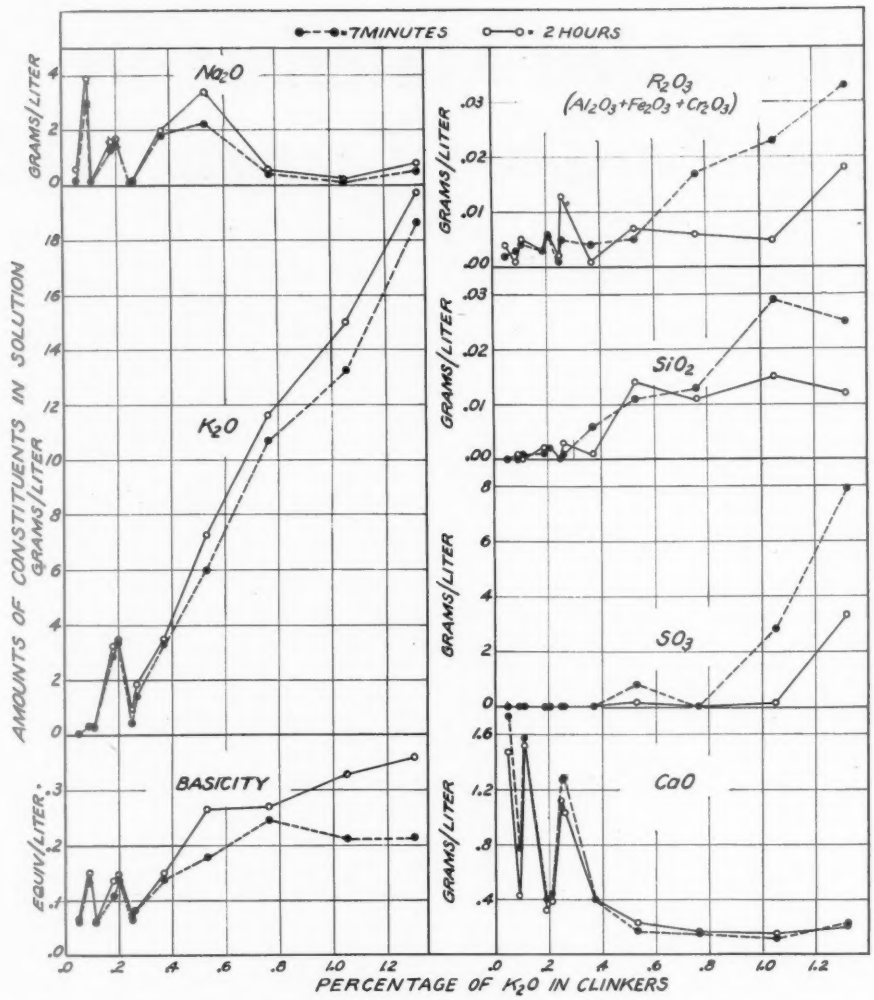


Figure 1.—Amounts of constituents found in filtrates from untreated clinker pastes at 7 minutes and 2 hours. (Note variations in scale).

MgO was either absent from solution or present in only small amounts and, therefore, the values are not presented in Figure 1.

The general effects of the additions on the compositions of the filtrates, as compared to those from clinker pastes without additions, were as follows:

The basicities were decreased by gypsum, calcium chloride, calcium acetate, and in most cases also by TDA. The addition of calcium chloride and acetate depressed the basicities for most filtrates to values ranging from 0.04 to 0.07 equivalent weight per liter. Sucrose and triethanolamine generally caused increases, whereas tannic acid and fluosilicic acid as a rule caused only small changes in the basicities.

The concentrations of K_2O and Na_2O were decreased by gypsum, generally by small amounts only. Triethanolamine, on the other hand, caused increases, many of which were large. Sucrose also generally caused increases, but most of these were small. The other additions, although in some instances causing relatively large changes, were not productive of any consistent or significant trends in the extractions of the two alkalies.

The CaO contents of the extracts (except those containing the added calcium salts) were governed primarily by the basicities. However, the extent of supersaturation of the extracts with respect to $Ca(OH)_2$ was affected variously by the added materials. Thus, TDA resulted generally in a higher supersaturation, whereas fluosilicic acid and tannic acid decreased the extent of supersaturation as compared to that of the filtrates from pastes containing no added materials. A wide range in the concentrations of CaO prevailed in the extracts containing calcium salts as added materials.

Gypsum increased the SO_3 contents of the extracts at 7 minutes to values ranging from 1.0 to 11.7 grams per liter. In general, nearly the same amounts of SO_3 were present in solution at 2 hours as at 7 minutes. TDA increased significantly the concentration of SO_3 in filtrates from seven of the twelve clinkers at 7 minutes but in the interval between 7 minutes and 2 hours the concentration decreased. Additions of calcium chloride, calcium acetate, sucrose and triethanolamine decreased the amounts of SO_3 in the three filtrates, which without additions contained significant amounts of SO_3, to approximately the same low concentrations prevailing in the other filtrates. Tannic acid and fluosilicic acid brought one additional filtrate, at 7 minutes, into the group containing significant amounts of SO_3 but otherwise did not produce any marked changes.

The SiO_2 content of the extracts appeared to be dependent on the CaO concentration regardless of addition used, except fluosilicic acid. The concentration of SiO_2 generally increased as that of CaO decreased. A plot of the CaO-SiO_2 data of the filtrates approximated the solubility relations reported[5] for the system CaO-SiO_2-H_2O at 30 degrees C.

The concentrations of the constituents of the R_2O_3 group except Cr_2O_3 were apparently not affected by additions of the inorganic salts. The addition of gypsum resulted in yellow-colored extracts from all clinkers. The filtrates from 5 clinker pastes with added gypsum contained from 0.005 to 0.030 gram of Cr_2O_3 per liter at the two time periods. Cr_2O_3 was not found in the extracts containing calcium chloride, calcium acetate, sucrose and triethanolamine. The organic additions increased the R_2O_3 ($Al_2O_3 + Fe_2O_3$) contents of most filtrates, triethanolamine increasing it to as much as 1.2 gram per liter, and the others by smaller amounts.

The deceases in the concentrations of the SO_3 were attributed to the precipitation of calcium sulfoaluminate according to the reaction,

$$3\ K_2SO_4 + 3Ca(OH)_2 + 3\ CaO.Al_2O_3 + 31\ H_2O = 3CaO.Al_2O_3 . 3CaSO_4 . 31H_2O + 6KOH$$

Evidence for the occurrence of this reaction was based on computations[1, 2] showing that the equivalents of $SO_4^=$ precipitated from solution in the interval between 7 minutes and 2 hours were equal to the increases in the OH^- concentration, allowance being made for changes in the concentrations of the alkalies and lime. The precipitation of the calcium sulphoaluminate also accounts, therefore, for the relatively high basicities in many of the filtrates from clinkers containing K_2SO_4.

The SO_3 contents of the filtrates (1.0 to 11.7 gram per liter) from pastes containing gypsum showed a correlation with the basicities (which

ranged from 0.05 to 0.16 equivalent weight liter). The high basicities prevailing in the extracts from pastes containing gypsum indicate that the alkali hydroxides were neutralized only partially.

The filtrates from pastes treated with calcium chloride contained smaller amounts of chlorine than that added to the mixing water. The decreases in the chlorine contents were attributed to the precipitation of calcium chloroaluminate.[6] On the assumption that all the chlorine precipitated as $3CaO.Al_2O_3 . CaCl_2 .10 H_2O$ computations showed that 3 to 7 per cent of the total Al_2O_3 in the clinkers had reacted in 7 minutes and 4 to 10 per cent in 2 hours. These results indicate that only small amounts of Al_2O_3 reacted with the calcium chloride during the two time intervals.

The decreased basicities and the increased SO_3 concentrations caused by TDA were due largely to the inhibition of the sulphoaluminate reaction. Although the reason for the retardation of the reaction is not apparent the addition of 0.23 per cent. of water during the incorporation of the material may have prehydrated the clinkers.

The low concentrations of SO_3 prevailing in the 7-minute extracts from clinker pastes containing calcium chloride, calcium acetate, sucrose and triethanolamine were interpreted as indicating the acceleration of the sulfoaluminate reaction.

Physical Constants of Aqueous Extracts The pH of the filtrates and of pure solutions of KOH and $Ca(OH)_2$ were measured electrometrically using a hydrogen electrode. So-called "electrode poisons", present in some of the filtrates, interfered with the determinations of the pH. Making allowance for these results a plot of the pH-basicity data on the extracts compared to a similar plot of data on solutions of KOH showed clearly the effects of the added materials on the pH at a given basicity. It was shown that calcium chloride and calcium acetate decreased the pH values of the extracts, compared to those of solutions of KOH, by large amounts. Gypsum caused only small decreases and the remaining additions had only minor effects on the pH-basicity correlation.

A detailed description of a method of calibrating the e.m.f. of the cell with solutions of KOH of known pH values is given in the previous report.[1]

The densities, surface tensions, and conductivities of all the filtrates are presented and discussed briefly in the same report.[1]

Results on Hydrating Clinkers The data, summarized as average, maximum, and minimum heats of hydration of the twelve clinkers with and without added materials, are given in Figure 2.

Heats of Hydration.—The ½- and 1- day values can not be compared directly with those determined at 7 and 28 days because of the differences in the methods of measurement. The results at each age, however, make possible a comparison of the heats of hydration of the untreated clinkers with those containing added materials.

The following discussion (which necessarily has to be brief in a report of this kind) will be concerned primarily with the trends of changes caused by the additions and with some of the more outstanding departures from such trends. The reader, seeking detailed information on the effects of the additions, should study the complete data published previously.[3] When the statement is made that an addition changed the heat of hydration it is to be understood that the change is in comparison with the heat of hydration of the clinker without addition.

Calcium chloride and *gypsum* increased the heats of hydration at ½ day, in a number of instances by several hundred per cent. These additions also caused fairly large increases at 1 day for most of the clinkers. Of the two additions, calcium chloride caused the larger changes at ½ and 1 day. At 7 days calcium chloride resulted in both fairly large decreases and increases, while gypsum generally caused only small changes. At 28 days calcium chloride reduced the heats of hydration of a few clinkers and altered only slightly those of the others; gypsum as a rule caused only insignificant changes at this age.

Calcium acetate and *fluosilicic acid* decreased the majority of the heats of hydration at ½ and 1 day but increased most of them at 7 and 28 days.

TDA increased somewhat the heats of hydration at ½ and 1 day for a number of the clinkers but a few were decreased. The changes at the two later ages were small.

Sucrose caused a number of large increases and a few decreases at ½ and 1 day. Only a few clinkers were not affected significantly at the two early ages. Most of the changes at 7 and 28 days were small.

Tannic acid reduced nearly all the heats of hydration at the two early ages and caused only a few large changes at 7 and 28 days.

Triethanolamine increased most of the heats of hydration at ½ and 1 day, generally by large amounts. Increases were also the rule for the six clinkers when tested at 7 and 28 days.

Strengths.—Only the average, maximum and minimum tensile and compressive strengths of the 1:3 standard-sand mortars prepared from the 7-minute pastes are reported here. The data are presented graphically in Figure 3. The basis for discussing the effects of the additions is the same as that considered in the discussion of the heats of hydration.

Calcium chloride and *gypsum* increased nearly all the strengths, both tensile and compressive, sometimes by several hundred per cent., at 1 and 3 days. Calcium chloride as a rule was productive of higher strengths than gypsum at the early ages; however, at 7 and 28 days the strength increases tended to be the same for both additions.

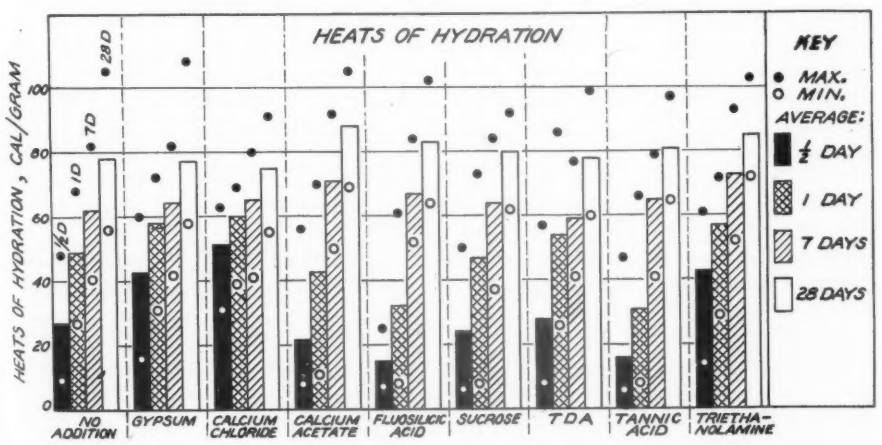


Figure 2.—Average, maximum and minimum heats of hydration of twelve clinkers with and without added materials. (Results for triethanolamine represent data for six clinkers only).

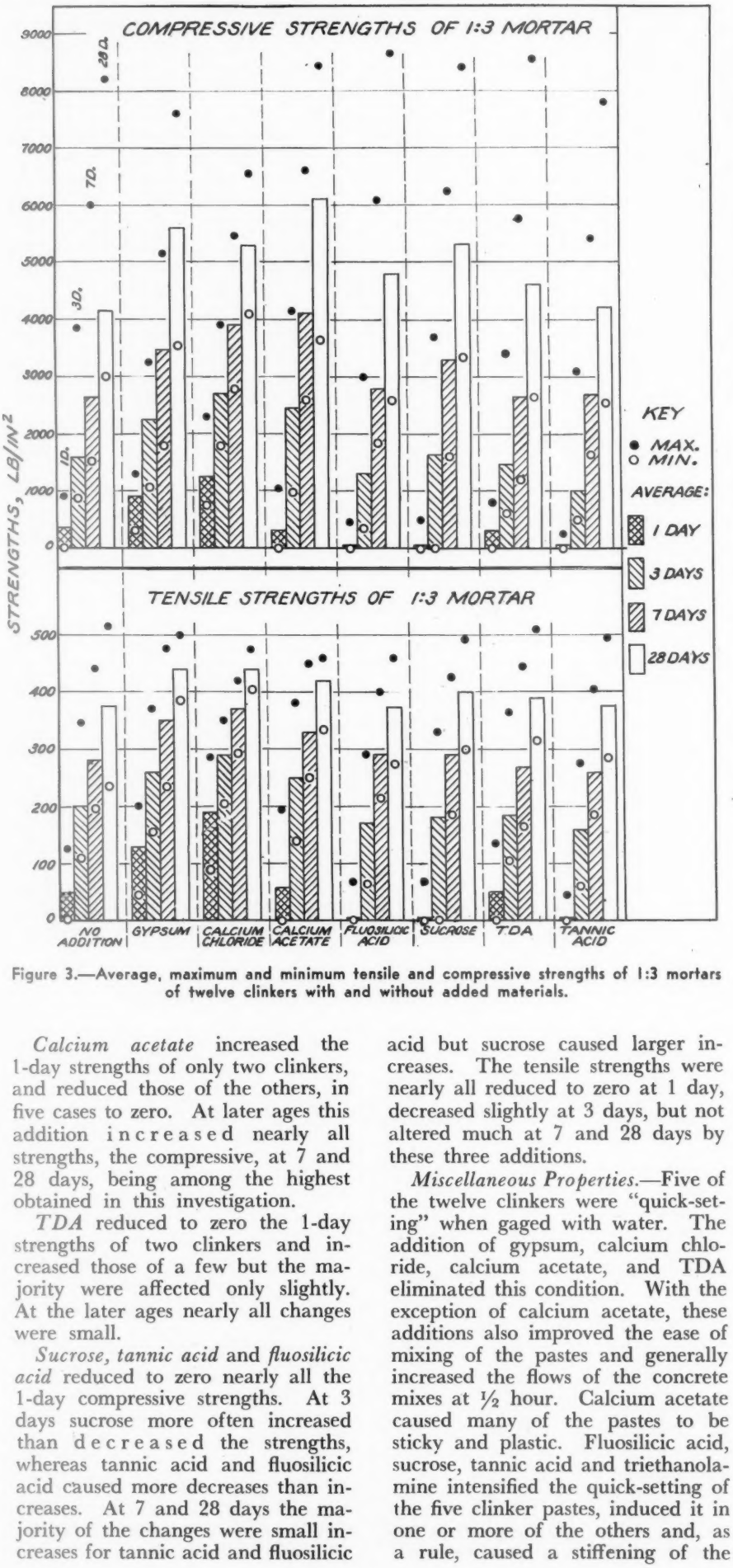


Figure 3.—Average, maximum and minimum tensile and compressive strengths of 1:3 mortars of twelve clinkers with and without added materials.

Calcium acetate increased the 1-day strengths of only two clinkers, and reduced those of the others, in five cases to zero. At later ages this addition increased nearly all strengths, the compressive, at 7 and 28 days, being among the highest obtained in this investigation.

TDA reduced to zero the 1-day strengths of two clinkers and increased those of a few but the majority were affected only slightly. At the later ages nearly all changes were small.

Sucrose, tannic acid and *fluosilicic acid* reduced to zero nearly all the 1-day compressive strengths. At 3 days sucrose more often increased than decreased the strengths, whereas tannic acid and fluosilicic acid caused more decreases than increases. At 7 and 28 days the majority of the changes were small increases for tannic acid and fluosilicic acid but sucrose caused larger increases. The tensile strengths were nearly all reduced to zero at 1 day, decreased slightly at 3 days, but not altered much at 7 and 28 days by these three additions.

Miscellaneous Properties.—Five of the twelve clinkers were "quick-seting" when gaged with water. The addition of gypsum, calcium chloride, calcium acetate, and TDA eliminated this condition. With the exception of calcium acetate, these additions also improved the ease of mixing of the pastes and generally increased the flows of the concrete mixes at ½ hour. Calcium acetate caused many of the pastes to be sticky and plastic. Fluosilicic acid, sucrose, tannic acid and triethanolamine intensified the quick-setting of the five clinker pastes, induced it in one or more of the others and, as a rule, caused a stiffening of the remaining pastes. The flows of the concrete mixes at ½ hour containing these additions, compared to those of concrete mixes without additions, showed both increases and decreases. Triethanolamine resulted in such excessive hardening that many of the pastes could not be mixed.

The quick setting caused by an addition was usually accompanied by a marked increase in temperature rise as compared to that of the paste without addition. The temperature-time curves showed that the early increases in temperature of the pastes induced by additions of fluosilicic acid, sucrose and tannic acid were nearly always associated with a subsequent marked retardation of the temperature increases and hardening during the first 24 hours.

Results of the Merriman sugar-solubility tests showed that only three of the twelve clinkers had "clear points" of 10 or less. (A "clear point" of 10 is the maximum permitted for Portland cement in this test.) Additions of calcium chloride, calcium acetate or TDA did not alter the rating. However, the number of clinkers having "clear points" of 10 or less were increased to four, six and nine by the addition of triethanolamine, gypsum and fluosilicic acid, respectively.

Results of the Paul floc test showed that the clinkers developed only small amounts of floc, the ignited weights of which ranged from 0.1 to 0.4 per cent. by weight of the clinker. The various added materials as a rule had only a slight or no effect on the amounts of floc developed.

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MINIMUM-WAGE RATES IN THE AGGREGATE INDUSTRIES

THE INDUSTRY committee for the "stone, clay, glass, and allied industries" appointed in May for the purpose of determining whether a minimum wage of 40 cents an hour should now be established for those employees in those industries who are producing or handling material that moves in interstate commerce, met in New York City on May 27. Prior to this committee meeting, the National Crushed Stone Association and the National Sand & Gravel Association submitted reports on minimum-wage practices in their industries. After extensive debate, in which the labor and public members indicated a favorable attitude toward the immediate establishment of the 40-cent minimum, an effort was made to submit a motion for not advancing the effective date of the 40-cent minimum in those states listed in Table III of the reports which showed a current practice of paying less than 40 cents hourly. This motion was ruled out of order on the ground that the statute did not allow wage classifications based exclusively on geographical differentials.

Then V. P. Ahearn, member of the committee representing the sand-and-gravel industry, submitted a motion for the nation-wide application of a 35-cent minimum rate for that industry with no reduction in present minimum-wage practices wherever 40 cents or more was being paid. This motion was amended by a proposal submitted by J. A. Rigg, representing the crushed-stone industry, that the same basis also be applied to the crushed-stone, lime, kaolin and mica industries. The motion was lost, the labor and public members and one employer member voting in opposition.

A majority of the committee thereupon recommended to the Administrator that a 40-cent minimum wage be established for all the industries defined as being covered by the "stone, clay, glass and allied industries". Under the law it is possible for the Administrator to issue such an order after public hearing, thus advancing the effective date of the 40-cent minimum. In the absence of such an administrative order the 40-cent minimum, under the statute, would become effective on October 24, 1945.

In the *Federal Register* of June 8 the Administrator of the Wage and Hour Division published a notice of the minimum-wage recommendation of the Industry Committee. He announced that he would hold a public hearing on the report of the committee on June 30, 1943, in Room 1610, United States Department of Labor, 165 West 46th Street, New York City.

Under the federal wage-and-hour law the Administrator is not controlled by the *prevailing* wage practice. If an industry committee recommends his doing so, the Administrator may proceed forthwith, after public hearing, to order the 40-cent minimum wage. The act declared a policy of reaching "the objective of a universal minimum wage of 40 cents an hour as rapidly as is economically feasible." Practically the only restraint on an industry committee and the Administrator is that the 40-cent minimum shall be delayed if there is any likelihood that it will "substantially curtail employment in the industry". Under present conditions that makes an obstacle almost impossible to overcome.

To obtain the wage data referred to, a questionnaire was sent to all members of the National Crushed Stone Association and of the National Sand and Gravel Association. That procedure, as compared with a canvass of the industry as a whole, greatly facilitated the survey.

Returns from the questionnaire were received from 68 crushed-stone companies covering 98 plants. These companies produced 31,714,302 tons of crushed stone in 1942, as compared with an estimated production of 160,000,000 tons for the commercial industry as a whole. Seventy-five of the plants indicated that they were subject to the wage-and-hour law and 23 that they were not. The plants included in the survey carried on their payrolls 6,604 employees as of September 15, 1942, and 5,788 employees as of April 15, 1943. Undoubtedly, the lower employment for April, 1943, as compared to the figure for April, 1943, as compared to the figure for September, 1942, is due in large part to the seasonal characteristics of the crushed-stone industry.

The crushed-stone companies making returns had operations in 20 of the 31 states substantially engaged in the production of crushed stone. The crushed-stone industry and the sand-and-gravel industry produced materials which, while highly competitive, are largely interchangeable, and operating conditions in the two industries are similar, resulting in wage practices which are comparable.

Returns were received from 91 sand-and-gravel companies covering 160 plants. These companies produced 46,939,200 tons of sand and gravel in 1942, as compared with an estimated production of 200,000,000 tons for the commercial industry as a whole. Eighty-four of the plants indicated that they were subject to the wage-and-hour law, 72 that they were not, and 4 gave no clear-cut answer. They had on their payrolls 6,256 employees as of September 15, 1942, and 4,866 as of April 15, 1943. The seasonal characteristics of the industry account in part for the smaller employment in April than in September.

The sand-and-gravel companies making returns had operations in 27 of the 48 states. It is believed, however, that an adequate picture for the 21 missing states may be obtained from data for adjoining or near states.

Returns from the states listed in Table I showed no minimum wages under 40 cents an hour.

The states listed in Table II indicated relatively-small numbers of employees at rates of less than 40 cents an hour. For the most part such employees were identified as, or appeared to be, watchmen or similar workers, who were paid weekly wages netting less than 40 cents an hour. There is reason to believe that many of them may be handicapped or superannuated workers. The average minimum rate in these states was enough higher than 40 cents to indicate that returns showing less than that amount were the exception rather than the rule. Footnotes to these tables suggest states from which no returns were received, but which may be considered as in the same categories as the states listed. An increase in the minimum-wage rate from 39 to 40 cents an hour, while, of course, having no effect on the states shown in Table I because they show no rates below 40 cents an hour, would probably have only a slight effect in the

states which appear in Table II.

In Table III are listed the states showing many minimum hourly wages of less than 40 cents an hour. It will be observed that the mean minimum wage in each of these states is less than 40 cents an hour, with one state in the sand-and-gravel industry showing a wage below 30 cents due to returns from companies not engaged in interstate commerce.

Table I.—STATES SHOWING NO MINIMUM HOURLY WAGES LESS THAN 40 CENTS

Crushed-Stone Industry	Sand-and-Gravel Industry[1]
.....	California
Connecticut	.....
Illinois	.....
Indiana	.....
Iowa	Iowa
.....	Kansas
.....	Maryland
.....	Massachusetts
Michigan	Michigan
Minnesota	.....
Missouri	.....
.....	Nebraska
New Jersey	.....
.....	New York
.....	Oklahoma
.....	Pennsylvania
.....	Washington
.....	Wisconsin

[1]Other states probably represented by the sand-and-gravel industry returns are: Connecticut, Idaho, Maine, Montana, Nevada, New Hampshire, North Dakota, Oregon, Rhode Island, South Dakota, Utah, Vermont and Wyoming.

The average minimum wage for all these states as of April 15, 1943, was 35 cents for the crushed-stone industry and 38 cents for the sand-and-gravel industry. All but one of the states listed in the sand-and-gravel portion of Table III showed some wages at least as low as 30 cent.

Table III reveals, also, that considerable numbers of employees receive less than 40 cents an hour—the average for the crushed-stone industry being 30 per cent. and that

Table II.—STATES SHOWING FEW MINIMUM HOURLY WAGES LESS THAN 40 CENTS

Crushed-Stone Industry	Sand-and-Gravel Industry[1]
.....	Colorado
.....	Illinois
.....	Indiana
Massachusetts	.....
New York	Minnesota
Ohio	New Jersey
Pennsylvania	.....
.....	Ohio
	.....
	West Virginia[2]

[1]Other states probably represented by the sand-and-gravel industry returns are: Arizona, Delaware and the District of Columbia.

[2]This state represents the principal disagreement between the crushed-stone industry and the sand-and-gravel industry data. The difference was recognized during the period of the National Recovery Administration (NRA), when the Code of Fair Competition for the Crushed-Stone, Sand-and-Gravel, and Slag Industries made a distinction between "West Virginia west" and "West Virginia east." Crushed-stone producers predominate in the eastern part of the state and sand-and-gravel producers in the western part.

Table III.— STATES SHOWING MANY MINIMUM HOURLY WAGE RATES LESS THAN 40 CENTS

State	Crushed-Stone Industry				Sand-and-Gravel Industry			
	Employees Reported	Mean Minimum Wage (an hr. e)	Percentage of Employees at Minimum	Percentage of Employees at Less Than 40 Cents	Employees Reported	Mean Minimum Wage (an hr. e)	Percentage of Employees at Minimum	Percentage of Employees at Less Than 40 Cents
September 15, 1942								
Georgia	335	0.34	14	37	.....	.....	.....	.....
Kentucky	186	.31	6	22	186	0.34	5.9	8.1
Mississippi	.....	.....	.....	.....	60	.30	60.0	76.6
Missouri	.....	.....	.....	.....	198	.40	19.2	4.0
North Carolina	101	.31	52	70	275	.35	29.6	29.6
South Carolina	442	.34	27	55	66	.22	19.7	59.1
Tennessee	366	.35	42	64	339	.41	17.1	7.4
Texas	360	.35	32	36	1,238	.36	30.7	24.4
Virginia	807	.34	28	39	95	.33	10.5	21.0
West Virginia	188	.38	3	2	.....	.....	.....	.....
Total or Avg.	2,785	.34	26	42	2,457	.36	25.6	21.8
April 15, 1943								
Georgia	305	0.34	14	38	.....	.....	.....	.....
Kentucky	106	.32	5	16	174	0.36	6.3	6.3
Mississippi	.....	.....	.....	.....	45	.30	64.4	77.8
Missouri	.....	.....	.....	.....	174	.43	18.9	4.6
North Carolina	125	.35	26	46	212	.35	24.0	24.0
South Carolina	374	.35	14	24	38	.28	18.4	42.1
Tennessee	307	.36	54	47	278	.41	16.9	4.3
Texas	396	.37	33	25	1,136	.38	29.2	23.9
Virginia	701	.34	18	29	60	.43	10.0	.....
West Virginia	151	.38	12	11	.....	.....	.....	.....
Total or Avg.	2,465	.35	23	30	2,117	.38	29.8	19.1

1 Other states probably represented by these sand-and-gravel industry returns are: Alabama, Arkansas, Florida, Georgia, Louisiana and New Mexico.

for the sand-and-gravel industry 19 per cent. The maximum percentage receiving less than 40 cents an hour is 70 in the crushed-stone industry and nearly 77 per cent. in the sand-and-gravel industry. Obviously, an increase in minimum wages to 40 cents an hour would have an important effect on the states listed in Table III.

From a study of the data given in Table III, the following conclusions may be drawn with respect to the states listed in it:

(1) An increase in minimum-wage rates to 40 cents an hour would result in a substantial increase in production costs.

(2) Existing price regulations of the United States government prohibit the passing of increased production costs on to the consumer, so many companies might be forced to operate at a loss or to cease operation.

(3) An increase in minimum wages would put those plants subject to an increase at a serious competitive disadvantage with respect to plants not subject to the increase.

(4) Any increase in minimum wages would result in the application of pressure to increase wages above the minimum level. To grant such increases, it is contended, would be inflationary in its effects and contrary to declared government policy.

Newer Type Fuses and Detonators Described

In the interest of safer and a more efficient use of commercial blasting materials, the Bureau of Mines has issued a new publication describing the structural features of detonators used by the mineral industries. Coal and metal mines and quarries are the heaviest users of industrial explosives and last year their purchases of permissible explosives, black blasting powder, and high explosives totaled about 385,000,000 pounds.

The publication, written by R. L. Grant, assistant chemical engineer in the Bureau's Fuels and Explosives Service, also reviews the improvements and uses of typical fuse and electric detonators introduced in recent years.

In describing new trends in the development of detonators, the report comments: "Recent developments, accelerated by wartime scarcity of metals, indicate that synthetic plastics and resins may find use in future detonators. Although a number of structural improvements in detonators for reducing the hazards due to static electricity have been suggested, it is probable that the peculiar origin and causes of static electricity under actual working conditions will lead to further investigations. It is likely, also, that the search for detonators or devices more suitable for seismographic work will continue."

The plant in operation. Loading hopper at right.

Output Increased 20 per Cent. by Using Wider Conveyor Belts

another ON THE SPOT report

NEAR Davison, Michigan —about 15 miles northeast of Flint—the A. S. Leffler Gravel Company has been working a glacial deposit for the last seven years. Much of the output is sold for road surfacing and maintenance and requires sizing and crushing of the oversize, but no washing.

Until three years ago a stationary

By HARRY F. UTLEY

plant was operated on the site but, in order to eliminate long hauls to the plant, stock-piling and rehandling of the product, the plant was abandoned and a portable crushing-and-screening plant was purchased. The latter, a Diamond Iron Works No. 36 Rotor-Lift unit, has more than lived up to the expectations of Mr. Leffler. Being mobile and mounted on pneumatic tires, the jacks can be released and the plant towed intact to a new position at the pit in short order.

The deposit under lease covers about 300 acres and the overburden is thick, averaging about 10 feet. This is stripped by a Koehring 303 dragline equipped with a 50-foot boom and a ¾-cubic yard Page automatic bucket. The plant is loaded by a Koehring 304 dragline with a 40-foot boom and a 1-cubic yard Page bucket, the bucket dumping directly into a hopper at the feed end of the plant where the pit-run material is put on the 24-inch by 30-foot plant conveyor. The conveyor discharges on the top deck of the plant's only screen, a 3- by 10-foot double-deck vibrator. The rejects from the top deck are chuted to a 10- by 36-inch jaw crusher and the lower-deck oversize passes to a pair of crushing rolls. Both reduction machines are in closed circuit with the plant conveyor and their products are returned to the belt by an 18-inch by 14-foot belt-conveyor and a 6-foot diameter Rotor-Lift elevator.

The sized material, usually well-proportioned minus-¾-inch gravel and sand containing from 25 to 30 per cent. crushed material, is carried by a 24-inch by 19-foot truck-loading conveyor to the waiting trucks. Originally the plant was equipped with belts 20 inches wide but, by increasing the width to 24 inches when they were replaced about a year ago, Mr. Leffler found that he was able to add as much as 15 cubic yards per hour to the plant's capacity without overloading the crushers and screen. The output averages about 80 cubic yards per hour, reaching 90 cubic yards at times.

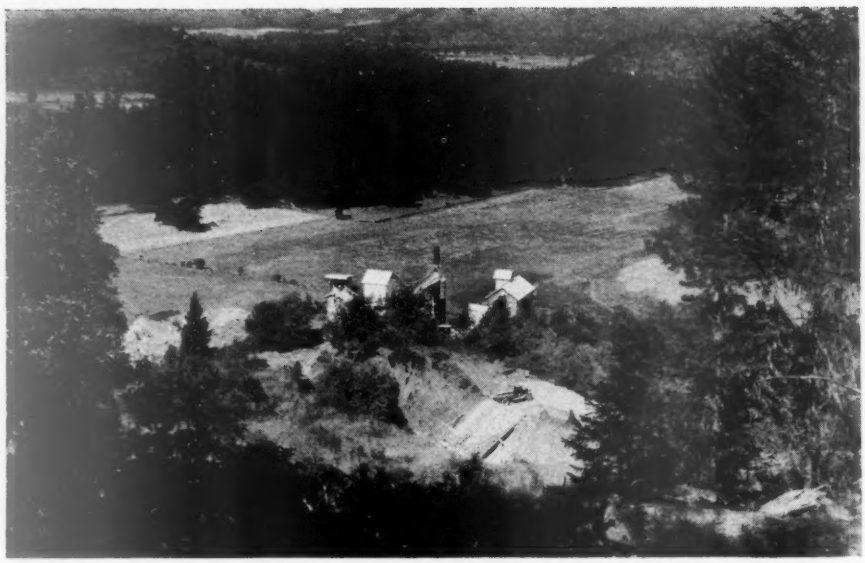
The company owns 8 dump trucks which make deliveries. Six are 4-cubic yard International and Ford units, the other two being Fords converted to 8-cubic yard carriers with special Grico two-axle, 4-wheel-drive assemblies. The extra tractive power of the Grico-converted trucks is used to advantage whenever the gravel plant is moved about the pit or transported temporarily to some distant location for production near a job. One of these units pulls the huge plant, which weighs nearly 25 tons, over the relatively soft ground with remarkable ease.

A well-equipped repair department is housed in part of the company's garage on the property. Included in the equipment is a 300-ampere Westinghouse Flexarc welder. Crusher rolls, jaw plates, and bucket teeth are built up regularly by welding with Manganal hard-surfacing metals. When Mr. Leffler bought the plant he also purchased a spare pair of crushing rolls. Although nearly 400,000 cubic yards of material has been produced, these spare rolls are still unused, thanks to the regular application of hard-facing metal on the original rolls.

A. S. Leffler, owner and manager.

One of the 2-axle-drive trucks being loaded.

Dragline in foreground is stripping; the one in the distance is loading the plant hopper.



LEFT—The lime plant as seen from the quarry up the mountainside. Dump truck discharging at car-loading bunker.

Oregon Quarry, First Opened to Yield Monument Stone, Supplies Material for Modern Lime Plant

IN the Rogue River country of southwestern Oregon, near the town of Williams, the Washington Brick & Lime Company of Spokane operates a small lime plant with an interesting historical background. The original limestone deposit from which this plant was supplied was opened late in the last century to supply the Oregon stone used in the construction of the Washington Monument. Later stone was quarried for tombstones. For a time it was also operated to supply stone for a local refinery of the Utah-Idaho Sugar Beet Company.

The first production of lime at this location occurred in 1926, when P. P. John, a Portland business man, installed an Arnold & Weigel vertical kiln and made and sold pebble lime. In 1930 the property was sold to a group of Ohioans who formed the Oregon Lime Products Company. These men developed the quarry and installed crushing equipment but, during the depression, did nothing with the lime department. Only crushed stone was sold until early in 1939, when the lime department was rebuilt and a Kuntz continuous lime hydrator installed. Operations continued spasmodically until late in 1939, when the plant was shut down entirely.

Late in 1940 the Washington Brick & Lime Company, one of the largest producers of nonmetallic minerals in the Pacific Northwest, took over the property and at once began an improvement program. Only minor changes were needed in the plant but it was found necessary to open a new quarry at a higher level in a deposit of higher-grade stone. The old quarry, which had in recent years been converted into a mining operation partly because of increasingly heavy overburden, is no longer used.

The new quarry is 300 feet above the top of the kiln and, for the present, the stone is brought 2,000 feet by road to the plant in trucks. The steep grade is a hazard and expense, however, and the adoption of some other method of haulage at a later date is contemplated. Quarrying is done in the usual manner with air drills and dynamite and the stone is loaded by hand into small mine cars. These are pushed to the edge of the slope, where the stone is dumped into a truck-loading bin.

At the plant the stone is discharged into a bunker near the old mine opening from which mine cars on the original tracks are used to carry the stone to the plant. There, from a track on one trestle, it is discharged to the limestone-pulverizing department and, from another track, it is fed to the kiln.

In the pulverizing department the stone is reduced by a 12- by 14-inch Acme jaw crusher which discharges it on a vibrating scalping screen. The oversize goes to a small Williams hammer-mill from which it is elevated back to the screen. A belt-conveyor feeds the material passing through this screen to a pair of fine-sizing screens over a bin. The products made include four sizes of poultry grit, agricultural limestone, 50- and 100-mesh "flour" for mixing in commercial feeds, and similar products. These products are bagged from spouts under the bin compartments. This department has a capacity of about 15 tons in 8 hours.

The kiln stone is dumped from the cars into the top of the 11- by 50-foot Arnold & Weigel vertical kiln which is wood-fired. It has an average output of 10 tons daily. Space has been left for a future second kiln. The lime is drawn into buggies and

Hydrator and bag packer at left. Bags being loaded from spout in foreground.

A view of the plant showing the 11- by 50-foot wood-burning vertical kiln.

dumped on the floor. After the few spalls are removed the lime is fed into a 4- by 8-inch Hammond jaw crusher. An elevator drops this lime on a stationary screen which scalps the pebble lime into a bin for shipment.

The fines from this screen can be discharged either into a 12-ton hydrator feed bin or into a bin for the quicklime-pulverizing department.

Looking up at the bins and separators over packers.

The Kuntz continuous hydrator incorporates all the patented features of this system, including the dust-control stack, the core sump, etc. It has a capacity of about 10 tons in 8 hours. The hydrated lime is elevated from it to a bin for mortar lime or to the first of two mechanical separators when other products are desired. The product of the first separator is 325-mesh chemical hydrate, which is discharged into a bin. The rejects go to the second separator below, which makes masons' hydrate, which is discharged into a bin. The rejects from the second separator drop into the original beater mill and a small ball-mill which was recently installed to increase the grinding capacity. The ground rejects are discharged back into the hydrator. The ball-mill can also be used for grinding the mortar lime. A screw-conveyor under the three finished lime bins feeds the various products to a 1-tube Valve Bag packer. In addition to the usual 50-pound bags this machine also packs 10-pound bags with a universal hydrate used in house construction.

When pulverizing hydrated lime the beater mill is operated at a speed of about 1,200 r.p.m. The same mill is used when pulverizing quick lime but different grates are then installed and it is speeded up to 2,400 r.p.m. The same separators, bins, screw-conveyor and packer are used.

Sledging stone to man size for loading into quarry cars.

WLB Sets Up Wage Stabilization Program in Fluorspar Industry

TO aid in the expansion of the fluorspar mining industry to meet vital war production needs, the National War Labor Board on July 2, by unanimous vote, established a wage-stabilization program which will eliminate the chaotic wage conditions which have prevented full-scale operations.

The War Production Board, the Army and other Governmental agencies seeking to expand the output of fluorspar mines had urged the WLB to stabilize the industry's wage structure, which had been thrown out of balance by the rapid expansion of the industry from a small peacetime producer to a vital war-production factor. Although relatively few employees are involved in the entire industry, their work has become of major importance to the war economy.

Fluorspar, a non-metallic, quartz-like mineral, is extensively used in the production of high-grade steel, high-octane gasoline, aluminum and ceramic materials.

About 1,400 workers are employed by the six major producers in Illinois and Kentucky directly involved in the board's order. Other companies in that area are ordered to show cause why the board's terms should not apply to them. The show-cause order exempts operators with fewer than 10 employees, unless they operate on the holdings of other producing companies.

A new wage structure was ordered by the board, making an average increase of about 14 cents an hour, to replace the existing chaotic wage schedule which provides an average wage, including overtime, of 67.3 cents an hour. This compares with earnings in other mining industries ranging from a low of 75.5 cents an hour in quarrying to a high of $1.22 in bituminous coal, according to a report prepared by Dr. Waldo E. Fisher, associate professor of industrial relations at the University of Pennsylvania, who was appointed by the WLB to make a special investigation of the wage conditions in the industry.

The board adopted the recommendations of Dr. Fisher, whose report stated he made the proposals "after taking into consideration the various facts and conditions brought to light in the survey, notably, (1) the critical shortage of fluorspar, (2) the losses in manpower that have occurred in this area, (3) the additional labor that must be obtained if full scale operation is to be maintained and the expansion program proposed by this industry is to be attained, and (4) the very inadequate economic position of the fluorspar miners when measured in terms of comparative wage rates and hourly, weekly, and annual earnings as well as cost of living levels and after consultations with employees, union leaders and operators . . ."

Three of the six companies specifically named in the board's directive came before the board in cases involving wage disputes with various locals of District 50 of the United Mine Workers. These companies are: Crystal Fluorspar Company, Mahoning Mining Company and the U. S. Coal & Coke Company.

The other three companies submitted requests for voluntary wage adjustments. They are the Aluminum Ore Company, Kentucky Fluorspar Company and the Rosiclair Lead & Fluorspar Mining & Smelting Company.

Dr. Fisher's report, which was prepared with the coöperation of the Mica-Graphite Branch of the War Production Board, the Bureau of Labor Statistics, the Office of Price Administration, the War Manpower Commission and the U. S. Employment Service, has been endorsed by the United Mine Workers, District 50, and by four of the companies involved.

Between 80 and 90 per cent. of the country's fluorspar output comes from the southern Illinois and northwestern Kentucky areas involved in these cases. Fluorspar also is mined in New Mexico, Nevada and Utah.

Fluorspar mining in Illinois and Kentucky is confined to two counties in Southern Illinois and three counties in Northwestern Kentucky. The entire area is 70 miles long and 30 miles wide, and is divided into almost equal parts by the Ohio River.

The board's order establishes two schedules, one for underground work and one for surface work. In Illinois the underground-work schedule provides for rates ranging from 76 cents an hour for common labor to $1.05 for shift leaders, while for surface work the rates will range from 63 cents for common labor to 93 cents for flotation operators.

The rates in the Kentucky mines are to be 10 cents lower in each classification.

"This differential seemed advisable," Dr. Fisher stated in his report, "in the light of the fact that wage differentials between these states are customary in other industries, that compensation costs are higher, that a very much larger percentage of the fluorspar is mined by hand in Kentucky and that the removal of the entire differential at one time would place a heavy burden on the industry in that state."

Dr. Fisher recommended establishment of a new wage-classification schedule, eliminating inequalities within each company's pay structure, rather than a straight general wage increase on the present rates.

"A general increase," he explained, "applied to the existing rates of pay would augment the wide ranges in wage rates that now prevail among jobs involving the same responsibilities and hazards, and requiring the same degree of skill. It would also accentuate the practice of mine workers to shop around for higher wages, add to the confusion in the labor market and to the discontent of the mine workers."

On May 1, 1943, each of the five operators in the Illinois - Kentucky area employed more than 100 workers. The largest producer, the Aluminum Ore Company, employed 503. Four of these five mining companies are located in Illinois. Twenty-seven operators in the two states employ more than 10 workers. In addition there are a great many small mining operations employing fewer than 10 workers. In Kentucky there are several hundred such operations. Many of the small enterprises are coöperative ventures undertaken by members of the same family. A very large number are run by farmers who mine the deposits on their land when not engaged in farming. These smaller units are exempted from the provisions of the wage schedule set up by the Board's directive order.

Approximately 2,500 to 3,000 persons are employed in the entire industry in the two states covered.

The job classification and standard rates of the order are shown in the table.

JOB CLASSIFICATION AND STANDARD RATES FOR ILLINOIS-KENTUCKY FLUORSPAR INDUSTRY[1]

Grade	Job Name	Hourly Rate for Grade	
		Illinois	Kentucky
	Schedule "A"—Underground Work		
A	Shift leader	$1.05	$0.95
B	Blacksmith—steel sharpener		
8	General repairman or mechanic Minor, Safety man Minor, Raise[2] Miner, Shaft[3]	.95	.85
C	Loading-machine operator Miner, Stope (Also called Drill operator) Miner, Drift (Also called Drill Operator) Motorman, Locomotive Timberman or soft-ground miner Track and pipe man	.90	.80
D	Miner's helper, Raise and Shaft Timberman's helper	.85	.75
E	Cager or Skip loader Miner's helper, Drift Motormen's helper	.80	.70
F	Grizzly man Labor, Common Mucker Pumpmen[4] Trammer	.76	.66
	Schedule "B"—Surface Work and Mill		
A	Flotation Operator (3-product separation) Hoistman-mechanic, Shaft[5] Locomotive-crane operator, Steam Working foreman, Carpenter Working foreman, Electrician Working foreman, Mechanic or Machine-shop	.93	.83
B	Carpenter, Class A (General)[6] Electrician, Class A (General)[7] Mechanic, Class A[8]	.88	.78
C	Blacksmith and steel sharpener Bulldozer operator Carpenter, Class B Crusher-plant operator Drier and Pellet-Machine Operator Electrician, Class B Engineer, Power-plant, Class A[9] Hoistman, Shaft, Class A[10] Mechanic, Class B	.83	.73
D	Engineer, Locomotive (Steam) Engineer, Power-plant, Class B Fireman, Boiler-room Fireman, Power-plant Flotation-operator, (1- or 2-product separation Grinding-plant Operator Hoistman, Shaft, Class B[11] Jigmen	.78	.68 .65
E	Blacksmith's helper Carpenter's helper Crane operator (gasoline)[12] Crusher operator's helper Drier and pellet-mill helpers Electrician's helper Engineer, Locomotive (gasoline) Flotation floorman Flotation helper Flotation reagent man Firemen, Crane Firemen, Locomotive Feeder Guard, Officer Hoistman, Barge Hoistman, Shaft, Class C[13] Mechanic's helper Painter Saw-mill operator Straw boss, Mill Straw boss, Surface	73	.63
F	Jigman's helper Sampler Slusher operator Truck driver	.68	.58
G	Car or tub dumper Grizzly men, Mill Guard Labor, Common Firemen, Heating-plant Picker Saw-mill operator's helper Table man Timber cutter Truck driver's helper Watchman	.63	.53

[1] These rates shall apply to all producers employing 10 or more wage earners and to those producers employing fewer than 10 employees who operate on the holdings of other producing companies.

[2] Also called "Drill Operator." Does not include stope preparation or raises up to 35 feet from working floor.

[3] Also called "Drill Operator." Does not include shaft miners working in shallow cribbed or dirt shafts. Work in such shafts falls in Grade C†.

[4] Makes no installation and does no piping; makes only simple adjustments and simple repairs.

[5] Required to handle hoist and keep it in good mechanical condition.

[6] Able to construct and maintain mine and plant structures from blueprint.

[7] Handles general maintenance, installation of new circuits and equipment, does transformer and conduit work, operates switchboard, etc.

[8] Able to construct and maintain mine and plant equipment with the minimum supervision.

[9] Must synchronise machines, operate steam turbines, etc.

[10] Required to handle 200 tons or more per shift.

[11] Required to handle 50 to 200 tons per shift, or men and supplies only.

[12] Five-eighths of a cubic yard and under.

[13] Required to handle up to 50 tons per shift.

DEPRECIATION . . . an Important Cog in Your Business Machinery

ONE item of expense, that has never been scrutinized carefully enough by producers and manufacturers of cement, lime, gravel and other nonmetallic minerals, is depreciation. Some even omit it from their cost calculation—a hazardous procedure before Pearl Harbor, because it begat selling prices that were too low for reasonable profit, and loaded with dynamite to-day, when war restrictions are curtailing profits. Then, too, the omission or erroneous calculation of depreciation will affect the income tax you pay. Tax is a major expense today. With rates the highest in history, every dollar deducted means a much bigger saving than formerly. If you short-change yourself on depreciation, you pay more tax.

Before Pearl Harbor we often found cases where the omission of depreciation or short calculation of the rate reduced the pricing computation from 3 to 5 per cent., about all the net profit earned with the operating set-up in these plants. These operators were cutting prices and did not realize it. When they saw their profit-and-loss statements, they got a shock. Because they were super-careful about charging up all expenses paid or incurred, they could not understand why they did not earn more money. Their selling prices were figured to net a reasonable profit on paper, yet the actual result, as shown on the profit-and-loss statement, was below expectations. Why? Because a substantial internal expense was not earmarked by an invoice as were other expenses, these operators paid too little attention to it. Obviously the same laxity now will cause more headaches than ever before because war restrictions and high taxes have complicated the problem and this condition should continue indefinitely.

Because the depreciation charge is an estimate and can not be calculated definitely as are other expenses, many pit and quarry operators just guess haphazardly and let it go at that. As a result machines are often scrapped or replaced before they have been written off the books and the operator stands the loss. The purpose of writing down an asset yearly against profits is to get your investment back piecemeal in your selling prices. The customer rightly should pay for the equipment used in producing what he buys. This angle of the problem is not thoroughly understood. For example, one cement manufacturer said recently, "If my depreciation charges are short of actual wear and tear, I can write off any loss of useful value on my income-tax return, so where do I lose?" This is true provided the loss of useful value is written off in the year in which it occurred, but the tax deduction does not make up for the loss incurred through short-pricing. You gave your customers part of your working equipment for nothing and this loss can not be redeemed.

All depreciation schedules should take cognizance of normal obsolescence, but no one can foresee forced obsolescence, which is brought about by revolutionary changes in equipment, abnormal growth or development, radical economic changes or other unpredicable factors which may force the retirement or other disposition of property prior to the termination of its normal useful life. Because there is likely to be a big economic change after the war, the pit and quarry operator may find himself a victim of forced obsolescence and he should give the matter consideration now so that he will be in a better position to take the bump in stride when it comes. Fore-warned is fore-armed. One way to "cushion" this hazard is to increase the depreciation expense on equipment where forced obsolescence seems likely to occur. In this way you will accelerate the write-down of the working assets and get the differential from customers, although you may have to get permission from the Internal Revenue Department before you can "up" the rate on your income-tax return.

Check over your depreciation schedules now. Revise them upward or downward, as conditions warrant. Give more than passing thought to this subject to-day. Don't take a hurried look-see and "guestimate." If you can legitimately report losses of useful value on your working assets, write them off in the year in which the loss occurs. Many operators in this field have lost out on such deductions on their income-tax returns because they failed to take them in the designated year. If you fail to take ample depreciation in one year, you can't make it up in another year, either from your customers or on your income-tax return.

Don't try to determine what the salvage or trade-in value is going to be when setting the rate. Some operators predetermine this figure but without success. Wait until the working asset is disposed of, then make the adjustment on your books. We have never known a case where the depreciation write-down at the termination of the equipment's usefulness has equalled the residue value. This is largely because producers and manufacturers in this field figure depreciation according to physical life when they should figure on its serviceable life. A working asset's mechanical life often exceeds its profitable serviceability. If depreciation charges are geared to mechanical life, which may exceed serviceable life, the rates will be inadequate and the operator must either scrap his equipment prematurely and take a loss on depreciation or use it until it shoots its last bolt and take a licking through high cost of operation, unsatisfactory output, substandard production results and lost trade. When eventually traded in or scrapped, an adjustment accordingly should be made on the books, but in most cases this value is nominal unless the asset is fairly new and traded in for a larger unit before it has lived its profitable life.

Our field studies show that pit and quarry operators in the nonmetallic mineral field, classify their assets for write-down as follows:

1. Composite accounts—All depreciable assets are included in one account with a single depreciation reserve.

2. Classified accounts—Depreciable assets are segregated into class groups where use is the guiding factor in the selection, such as buildings, machinery, office furniture, fixtures, trucks.

3. Group accounts—Assets similar in kind which have about the same average useful life are included in one account.

4. Item accounts — Individual records are maintained indicating the cost or other basis and a depreciation reserve is set up for each item.

By ARTHUR ROBERTS

Wherever possible, use item accounts. We have found that the depreciation rates have been computed more accurately by this method; hence, selling prices did not carry the hidden-loss hazard found where other methods are used and income-tax expense was kept at the minimum.

When costing sales, operators often use figures covering the previous calendar year and these figures include a charge for depreciation. In the meantime they buy additional machinery and do not include depreciation on it until the following year. Obviously their costs are short and their selling prices that much less profitable. If you buy new equipment during the year, start counting depreciation on it right away so that an adequate charge is included in your costs. The annual charge-off for depreciation also gives an erroneous picture of the current month's profit. Prorate depreciation monthly so that this expense is figured in monthly overhead and the monthly net profit is correctly shown.

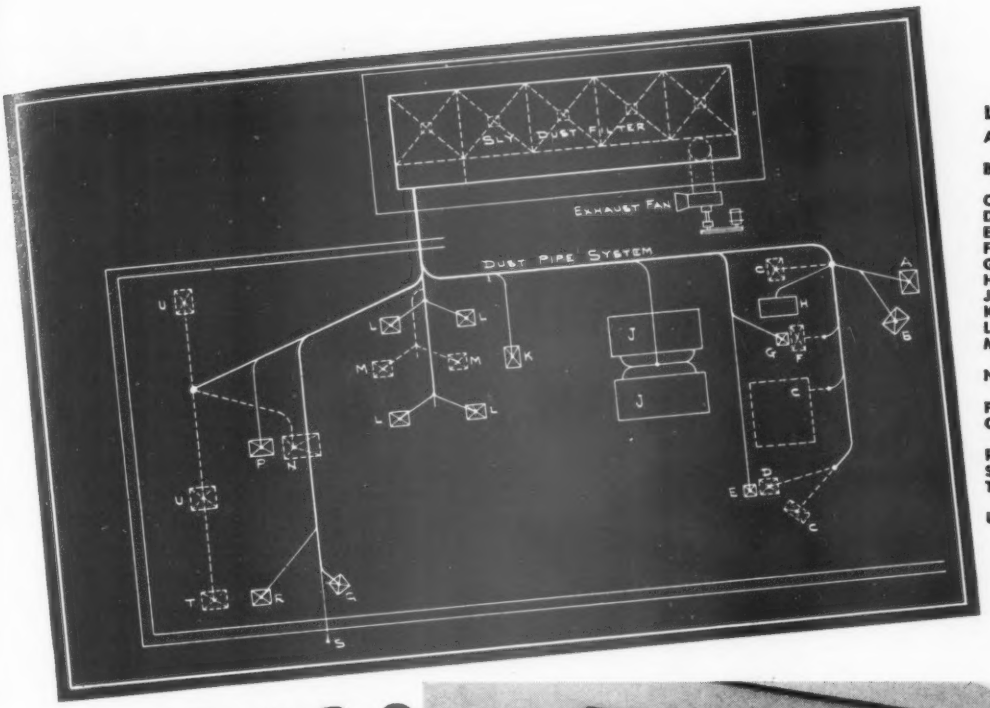
To-day another factor must be considered when computing the depreciation. If it develops at any time during the useful life of an asset that either the life originally assigned or the depreciation rate applicable to the asset has been incorrectly estimated, a redetermination of the depreciation deduction may be in order so that the unrecovered costs may be recovered ratably over the revised estimated remaining life. A machine may last 10 years operated 10 hours daily and 5 years operated 24 hours daily. If depreciation schedules are based on equipment operated 8 hours daily and it is working 16 hours daily, obviously it will wear out twice as fast and the charge should be increased accordingly. So, to make sure your costs are accurate, it may be necessary to take accelerated wear and tear or an increase in the rate charged, where equipment is worked overtime, depending on conditions. The operator using equipment longer hours because of to-day's increased demands should give consideration to accelerated depreciation because it may be permitted on his income-tax return, thereby reducing the tax. On the other hand, the operator forced to keep certain machines idle for any reason whatsoever should take depreciation at the usual rate. Idle machines take up space, your investment carries on, and age is taking it toll, in some cases a heavier toll than when the machines are operating. The government has permitted the taking of depreciation on idle machines but you must take the deduction in the taxable year, otherwise you may not be permitted this benefit later on. Then, too, if you do not take the deduction, you pay that much more income tax and you shortchange yourself on selling prices if you omit the depreciation for idle machines from your cost figures.

When machines and other production assets are written down completely, depreciation ceases and it would seem that profits would increase wthout this load. In many fields, including pit and quarry operation, users of equipment written off the books, hence, no longer charged to profits, are sometimes reluctant to invest in modern replacements because they dislike the idea of having the business once again reduce profits through depreciation charged during the profitable life of the modernized units. Our experience shows that this is erroneous reasoning. It may seem that profits will increase without this load, but our field studies show otherwise in the majority of cases because the equipment is then too old to turn out a profitable volume of work. Old equipment curtails sales and increases overhead expense so that these deficiencies exceed the depreciation charges brought into being by the purchase of new equipment. If you can get it now, it will pay to replace old equipment with new. At any rate, when all types of machines are available again, make sure to modernize as quickly as possible if your equipment is old. Modernization always pays. The postwar period should offer opportunities for earning substantial profits, but your equipment must be right.

Maintenance and repairs always had a bearing on the rate of depreciation. Equipment that was kept up properly depreciated at a lower rate. To-day this picture has undergone a radical change. Producers and manufacturers in this field should get the right perspective. Due to the difficulty of getting repair parts and manpower to provide adequate up-keep, the operator may have to forego this expense for the duration. As a result his equipment will depreciate faster than heretofore, yet his profits on paper will be inflated by the sum he would have expended for up-keep. Moreover, not having laid out the money, he can not take the deduction for up-keep on his income-tax return and must pay a tax on the "water."

Pit and quarry operators in this field have queried us on this apparent inequality, contending that depreciation goes on in war and peace and if repairs are neglected when needed, they gang up and take a relatively bigger toll sooner or later or compel premature replacement. We want to point out that the carry-back amendment in the 1942 income-tax bill takes care of this, otherwise, operators would have to pay higher taxes for the duration and then, when they eventually had to make the cumulative repairs in the postwar period, the expense might be so great that operations for the year of reconditioning would show a loss with no tax benefit. Under the carry-back provision you can carry back an operating loss for two years but not prior to January 1, 1941. If losses exceed this time limitation, you're stuck with the leftover. The carry-back provides the same relief in periods of declining profits that the two-year carry-over of operating losses, legalized in the 1939 bill, affords in periods of increasing profits. Under the carry-over provision a 1941 loss may be carried over to 1942, and if the loss is not absorbed in 1942, it may be carried over to 1943. After that, if the loss is unabsorbed, you take the licking. Don't forget the carry-back and carry-over provisions because they will help you ride the peaks and dips of the war and postwar economy.

To our knowledge there are eight different methods of charging off depreciation. Operators have often asked us to detail them, usually because they assume that another method of figuring depreciation will enable them to reduce this expense or increase it. That is a hopeless desire. About 95 per cent. of the business organizations in this country, from the corner grocer to the Croesus utility, use the straight-line method by which original cost is divided by the years of useful life and the charge pro-rated evenly over the years. That is the method the operators in this field should use. Besides, the Internal Revenue Department recommends it. Another method used in some plants calls for reducing installments, by which less depreciation is charged as the years roll by, on the assumption that a machine is second-hand in six months and will sell for about half its cost, hence, the heavier charges in early years, but remember that depreciation measures the service capacity of a working asset, not its market value.

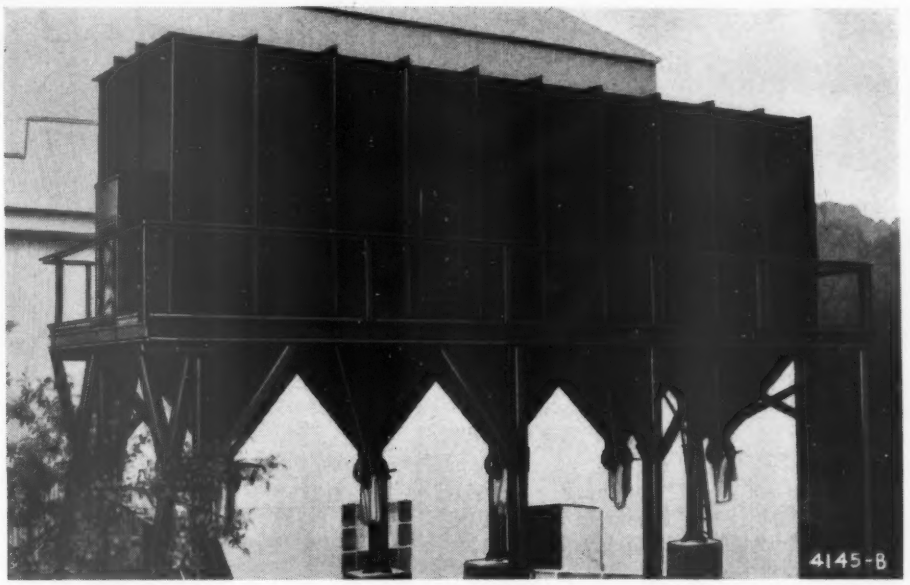


LEGEND

- **A** Discharge belt conveyor to scalping screen
- **B** Discharge belt conveyor to storage bin
- **C** Discharge of roll crushers
- **D** Boot of bucket elevator
- **E** Head of bucket elevator
- **F** Boot of bucket elevator
- **G** Head of bucket elevator
- **H** Vibrating screen
- **J** Two double vibrating screens
- **K** Head of bucket elevator
- **L** Magnetic separators
- **M** Discharge magnetic separators to belt conveyor
- **N** Discharge belt conveyor to bucket elevator
- **P** Head of bucket elevator
- **Q** Discharge bucket elevator to belt conveyor
- **R** Head of bucket elevator
- **S** Bulk carloading
- **T** Discharge belt conveyor to bucket elevator
- **U** Discharge of "feeders" to belt conveyors

SLY DUST CONTROL

IMPROVES WORKING CONDITIONS— UPS PRODUCTION



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Prior to the Sly installation, the dust presented a serious problem. The company consulted us. Definite air volumes were determined and the system installed accordingly—resulting in improved working conditions and increased production.

Sly Dust Filters offer certain exclusive advantages which help enormously in efficient operation:

1. Greater filtering capacity because of more filtering cloth
2. Taut bags (patented) save power and improve dust removal
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Write us fully. We shall analyze your problems and tell you exactly what can be accomplished. Sly Dust Control pays for itself.

THE W. W. SLY MANUFACTURING CO.

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SLY INDUSTRIAL DUST CONTROL

"It's a FIST-GRIP on Hitler's Throat... Saving Fighting Metal, Speeding the Job..."

"Yes, we use Laughlin 'Fist-Grip' Safety Clips," says this Super. "Three of them do the work of four U-bolts, and they don't crimp and injure wire rope that we want to re-use."

Another says: "The 'finger-pinch' U-bolt clip wastes rope and clips. This 'Fist-Grip' Clip will help choke Hitler by saving time and metals."

These 3 Savings on the Job Mean More Guns, More Bullets

Saves Accidents — can't be put on wrong even by inexperienced men; doesn't weaken rope; greater holding power.

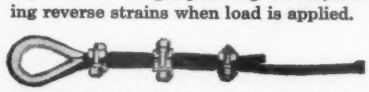
Saves Metals — 25% fewer clips do the job better, saving steel; no crushed rope ends; flush nuts — no battered threads.

Saves Time — fewer clips needed; nuts on opposite sides tighten easier, faster with any type wrench.

Greater holding power with 25% fewer clips

Look for Laughlin Products in Pit & Quarry Handbook

Unavoidably crimp, distort and bow wire rope with this "finger-pinching" action, causing reverse strains when load is applied.



LAUGHLIN "FIST-GRIP" SAFETY CLIPS

Hold rope in smooth, vise-like grip, with no reverse bends under load and no protruding threads to become battered and spoiled.

THE THOMAS LAUGHLIN *Company* PORTLAND, MAINE

7,500 Tons of Sand Used to Save Plant from Rising Waters

Sand was the main ingredient in a successful emergency "recipe" concocted to save Plant No. 1 of R. G. Le Tourneau, Inc., at Peoria, from the recent, record Illinois River flood.

A grand total of approximately 15,500,000 pounds—or 7,500 tons—of sand was rushed *via* truck and train to the threatened area from four commercial pits within a 20-mile radius of Peoria. The suppliers were the Peoria Builders' Supply Company, the East Peoria Sand & Gravel Company and the McGrath sand and gravel pits at Pekin, 10 miles south, and Chillicothe, 20 miles north, of Le Tourneau's.

The Pekin pit of the McGrath firm furnished 7,794,000 pounds f. o. b. pit, with the purchaser directing the trucking facilities. The McGrath pit at Chillicothe sent another 554,800 pounds f. o. b. pit, routed in six car-loads over the Rock Island railroad, which passes both the vending and receiving points involved. The East Peoria Sand & Gravel Company supplied the largest amount, 7,852,000 pounds f. o. b. to the Le Tourneau plant, and the Peoria Builders' Supply delivered 698,500 pounds.

Purely because it happened to be the major amount on hand at each pit, "torpedo" sand was shoveled into the 275,000 bags which nearly 3,000 Le Tourneau war workers filled to make a temporary levee almost a mile long.

Though the main Le Tourneau Plant No. 1 building is over 1,800 feet long and edges well into the river even during normal stage, the sand bags held out walls of abnormally pressured water as high as 8 feet, thereby saving millions of dollars of raw material and machinery

Sand-bagged areas being built up.

Water was 7 feet deep outside this fence. Note houses almost submerged up the road.

for the making of war-needed earth-moving equipment.

Le Tourneau leaders soon found two ways to use sand against the flood. Up to a 4-foot height they left space between two stacks of sand bags, where loose sand could be shoveled in between. Wherever the river line went above 4 feet, sand bags were piled close with no loose sand left to afford outside water pressures a chance to open seep holes. A 1-to-3

Power lift-trucks rushed bags of sand to threatened areas.

ration was kept in all the sand bagging; if the sandbag levee was 10 feet high, it was at least 30 feet wide at its ground base. Since there are no stationary levees around the factory, all the emergency sandbag levees were literally built "from the ground up."

Despite flood speed, a remarkably accurate account was kept of sand reception, billing and payment. Thanks to the suppliers' coöperation with the Le Tourneau purchasing department, not one ounce of sand went unaccounted for. Exactly 7,809 tons, including some clay and gravel for emergency access roads needed for fills as the sand trucks moved across the mushy plant grounds, were checked in with no difficulty. The total bill of $9,327.35 is already paid in full!

Nearly 200 sand-hauling trucks, all told, cleared the Le Tourneau gates during the battle with nature. Twenty-three trucks were sped simultaneously between the McGrath Pekin pit and the Le Tourneau plant in Peoria. As much as four carloads of sand per hour came in by truck for several days, with flood controllers scooping it into sand bags as fast as it arrived.

Now that the flood has gone, the sand has been emptied into a small mountain on an unused corner of the plant yard. There it will remain hopeless the situation first appears. for use in cement mixing and other operations in the Le Tourneau plant-construction program. The gravel, 1 to 1½ inches in size and used for temporary roads base, is being left on the ground to solidify such areas from now on.

Le Tourneau officials recognize that, though pumps, canvas and other water-withholding materials were also necessary, the flood fight could not have been victorious without sand and the coöperation shown by pit operators and others concerned. The company now readily suggests the use of sand to save any industry from flood.

YOUR JOB IS PLAT-O's JOB

On scores of screening jobs covering the widest range of operating conditions, these facts about PLAT-O Vibrating Screens have been definitely established:

That PLAT-O's wide speed range and ready adaptability to all types and sizes of aggregates meet every requirement for *accurate sizing.*

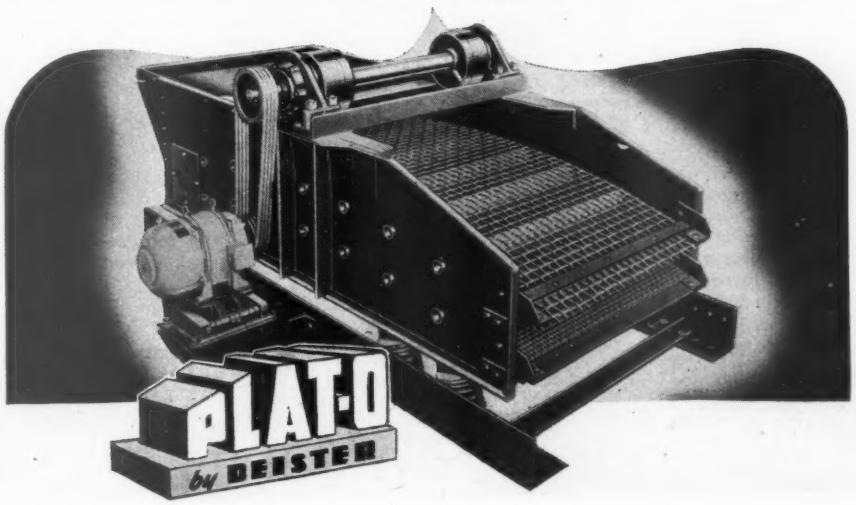
That PLAT-O's fast conveying action, flat screening angle and high speed vibrating mechanism meet every requirement for *maximum tonnage.*

That PLAT-O's rugged, all steel welded construction and simple, trouble-free design meet every requirement for *dependable performance.*

That PLAT-O's record on all of these points meets every requirement of *your job.*

Most models of PLAT-O Vibrating Screens are still available for immediate delivery. Write today for specifications and prices.

DEISTER MACHINE COMPANY, Fort Wayne 4, Indiana



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LOAD LUGGER Trade Mark Reg.

Fits on any standard truck chassis
Only 15 seconds for loading or dumping
Utilizes 5 to 10 detachable "bodies"
Handles wet or dry bulk materials

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In these days of emergency production you cannot afford to have idle trucks standing by waiting to be loaded. With a truck-mounted LOAD LUGGER, your hauling and dumping operations are continuous. Buckets are picked up as fast as filled, then dumped and the empties returned for re-loading. This is the fastest method of feeding crushers, doing quarry work, stripping overburden, and handling various materials.

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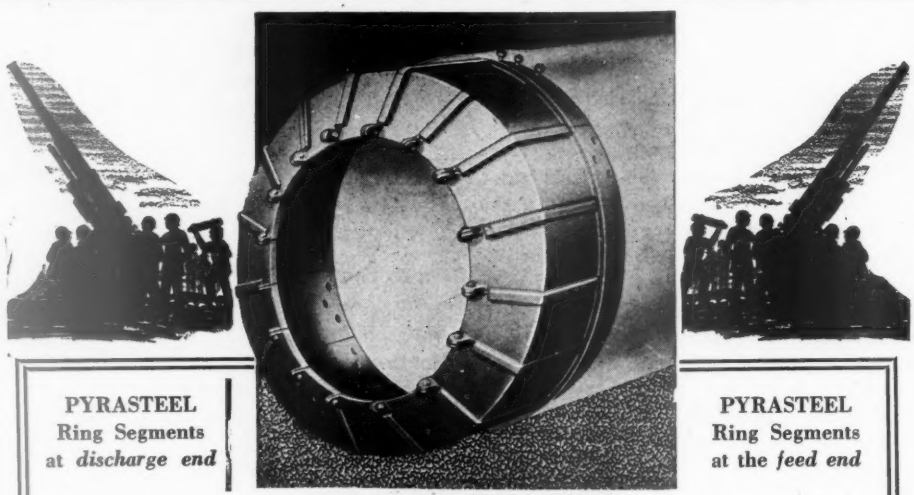


PYRASTEEL Ring Segments at *discharge end*

PYRASTEEL Ring Segments at the *feed end*

FEED END INSTALLATION

PYRASTEEL Protection at *both* ends

You can't afford to risk kiln-end "burnouts" that cause serious shut-downs and costly repairs. Remember that PYRASTEEL Kiln-Ends are available for both the *discharge and the feed ends* of your rotary kiln. They give continuous service at high temperatures, and outlast ordinary castings many times over . . . as proved in scores of installations where PYRASTEEL is giving satisfactory results. *Write for Bulletin of this "Sure-Fire" heat-resisting alloy.*

CHICAGO STEEL FOUNDRY COMPANY
PYRASTEEL — CHICAGO — EVANSTEEL

New Plant Turns Out First Ballast Order

The first trainload of crushed stone ballast from the new Wyalusing, Wisconsin, quarry was hauled out recently.

The quarry will furnish about 50,000 cubic yards during 1943 for the ballasting of 28 miles of roadbed between La Crosse and St. Croix, Wisconsin, for the Burlington Railroad. The entire project will involve most of the railroad's roadbed between Chicago and Minneapolis, and will probably take about five years.

The quarry land includes 16 acres of river bluffs near the Mississippi river in southwestern Wisconsin. The railroad acquired the land after tests showed that the Wyalusing hills contained exceptionally hard rock. Work on the quarry project began in April, 1943.

Stewart Buys 40 Acres Near Present Quarry

The Stewart Sand & Material Company has acquired 40 additional acres of deposits adjoining the quarry of its subsidiary, the Kansas City Crushed Stone Company, near Independence.

PERSONAL MENTION

W. H. ROBERTSON has been elected vice-president of the Massey Concrete Products Company with offices in Chicago. He has been associated with the organization and its predecessors since 1922. Prior to 1927 he was assistant chief engineer and since that time has been located in New York City, first as resident manager and later as eastern sales manager.

HENRY GRAUPNER, southern sales manager for the Marquette Cement Manufacturing Company, for the last ten years, has been promoted to general sales manager. He had been in the company's general office in Chicago, and only recently completed 20 years service with Marquette. JOHN L. QUARLES of Jackson, Tennessee, has been appointed southern sales manager.

FRANCIS O. CLUKIES has joined the sales staff of Robins Conveyors Inc. He will specialize in products of the Mead-Morrison Division.

FRED O. DAVIS has been elected president of the New Mexico Miners and Prospectors Association. He has long been identified with mining and prospecting in New Mexico, and since 1935 has been associated with the Potash Company of America.

PAUL DIETZ has been appointed export sales manager for the general machinery division of the Allis-Chalmers Manufacturing Company. He was formerly with the export division of the B. F. Goodrich Company, Akron.

F. B. SCHWARTZ, manager of the Minnesota Pneumatic & Electric Tool Company, Minneapolis, has been named special representative for the Northwest for the H. K. Porter Company, Inc., Pittsburgh, maker of industrial locomotives, chemical processing equipment and all types of pumps.

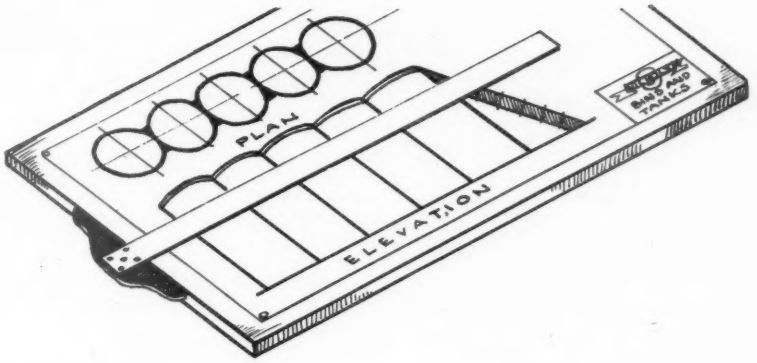
E. PERRY HOLDER, president of the Vulcan Iron Works, Wilkes-Barre, Pennsylvania, has been elected president of the Wickwire Spencer Steel Company. He succeeds E. C. BOWERS, who has been connected with the company since 1911 and has been President since 1926. Mr. Bowers has resigned because of serious illness but will continue as a member of the board of directors and executive committee and act in an advisory capacity.

HECTOR X. ESCHENBRENNER, president of the Universal Concrete Pipe Company, Columbus, Ohio, has been named a member of the board of directors of the Columbus Chamber of Commerce.

FRANK M. TRAYLOR, vice-president, Florida Portland Cement Company, Tampa, is a member of a new industries advisory division of the Florida State Chamber of Commerce which was recently named by Chamber President Walter C. Sherman "to assist local communities and industries in developing Florida's industrial future."

J. F. KOELLISCH, former advertising agency account executive and trade journal editor, has been named advertising and sales promotion manager of L. Sonneborn Sons, Inc., New York, oil refiners and manufacturing chemists.

ADOLPH G. SCHROEDER has been appointed manager of the machinery department of Iron & Steel Products, Inc., Chicago.



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"NICHOLSON" concrete storage bins are the result of 30 years of engineering research and specialized experience . . . over 5000 completely equipped bins and tanks in successful operation throughout the United States and foreign countries.

CONSTRUCTION

"NICHOLSON" organization — experience — facilities and ability to handle large and small contracts, insures the utmost in modern economical construction.

SPECIALIZATION

"NICHOLSON" as specialist in bulk storage bins and tanks—exclusively—also pioneering in slip form construction can solve YOUR storage problems — AND can offer helpful suggestions which will cut YOUR costs.

ONE RESPONSIBILITY

Your storage project, in any location—in any size, for any granular material is guaranteed through Nicholson's undivided responsibility contracts.

BULK STORAGE COAL-GRAIN-LIQUIDS STORAGE HANDLING EQUIPMENT
THE NICHOLSON CO.
CONSTRUCTION CEMENT-OIL-CHEMICALS

TEN ROCKEFELLER PLAZA, NEW YORK

HAROLD L. LUCAS has been made acting superintendent of the Portland plant of the Colorado Portland Cement Company, assuming the duties formerly handled by the late Superintendent M. F. Fleming, who died July 17.

WALLACE E. WING, chemical engineer, Marblehead Lime Company, Chicago, has been elected assistant vice president in charge of research and chemical supervision according to an announcement by President Bernard L. McNulty. ROBERT A. TEMPLE, superintendent, South Chicago plant, has been appointed operating manager of all the company's plants. MARK E. SNYDER succeeds Mr. Temple as superintendent of the South Chicago plant.

FRED B. FRANKS, whose retirement at the age of 73 as vice-president and general manager of the National Portland Cement Company was announced in a recent issue, is still a member of the company's board of directors and he retains his interest in the company. His present headquarters are the Horlacher Brewing Company at Allentown which he purchased about eight years ago. Before building the National plant, Mr. Franks organized and constructed cement plants at Martins Creek, Bath and Sandts Eddy, Pennsylvania, which were later sold to Alpha Lehigh and Keystone.

R. J. NADHERNY has been made production manager of the Athey Truss Wheel Company, Chicago. He has had 20 years of experience with equipment similar to the products manufactured by Athey, which qualifies him for his new position. Seven years of this time were spent in sales engineering capacities with the Mercury Manufacturing Company, Chicago.

JOHN EASTON has been appointed director of the development and standardization activities of the Whiting Corporation, succeeding A. J. Brown who has been transferred to California to be manager of the Pacific Coast branch.

GEORGE B. CAREY, 74, owner of the Southern Amiesite Asphalt Company at Birmingham, died at his home in Lexington, Kentucky, recently. He had been ill several months.

OBITUARY

ROBERT H. MATHEWS, foreman at the Colton, California, plant of the California Portland Cement Company, died recently after a brief illness. He was 63 years old.

DAVID ALEXANDER, 55, died of a heart attack at Petersburg, Virginia, recently. He was formerly connected with the Dixie Sand & Gravel Company and was secretary-treasurer of the Virginia Mineral Aggregates Association at the time of his death.

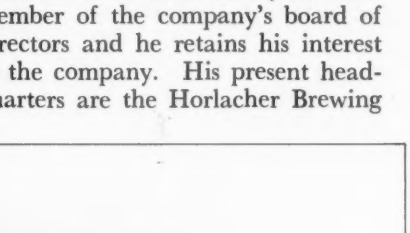
CURTIS H. TRONE, assistant treasurer of the Thomasville Stone & Lime Company, Thomasville, Pennsylvania, passed away July 22.

ROSS WHITE, 54, construction foreman at the Ada plant of the Oklahoma Portland Cement Company, passed away recently after a brief illness.

WILLIAM B. GATEWOOD, president of the Miami Gravel Company of Huntington, West Virginia, died August 5. He was injured in a fall about two months before his death and never completely recovered.

PSC CARS

PROVIDING DEPENDABLE HAULAGE FOR MINING OPERATIONS EVERYWHERE

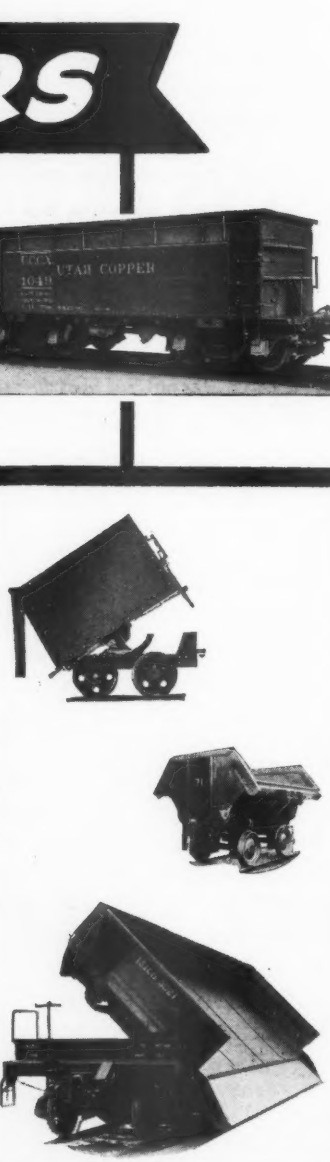


These husky, durable industrial cars are doing an outstanding job keeping tonnage up to war schedules.

Above and below ground these dependable cars are providing uninterrupted haulage service in many of the country's vitally important quarry and metal mining operations.

Write for descriptive bulletin.

"Designers and Builders of Railway Cars Since 1898"



ARMY E NAVY

PRESSED STEEL CAR COMPANY, INC.
INDUSTRIAL DIVISION
PITTSBURGH, PA.

TRAFFIC News Digest

I. C. C. Reports

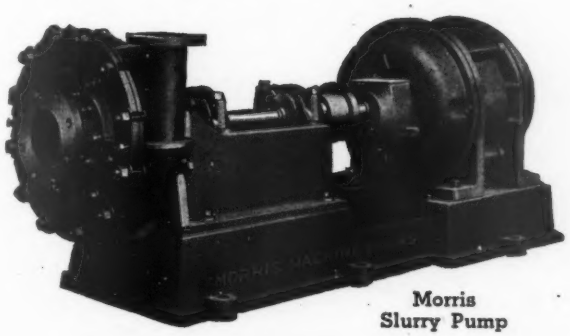
Limestone.—Docket 28889. Great Lakes Sugar Company vs. C. & O., *et al.* By the Commission. Report written by Commissioner Patterson. Applicable charges at rate of $3.02 sought to be collected on 58 carloads of crushed limestone shipped between Sept. 20 and Oct. 25, 1939, inclusive, from Calcite, Michigan, to Findlay, Ohio, unreasonable to the extent they exceeded charges that would have accrued at a rate of $1.42. Shipments found not to have been misrouted and defendants authorized to waive collection of outstanding undercharges of $5,931.11.

Talc.—Docket 28824. Southern California Minerals Company vs. Union Pacific *et al.* By the Commission, and the report written by Commissioner Splawn. Dismissed. Rate of 72 cents sought to be applied on carload shipments of talc, in bags, minimum weight 80,000 pounds, moving in 1940, 1941, and 1942, from Los Angeles, to New Orleans, Stuttgart, Arkansas, Freeport, Illinois, New York, Baltimore, Memphis, and Philadelphia, applicable. Applicable rates of 72 cents in effect prior to March 18, 1942, and 72 cents thereafter not shown to have been or to be unreasonable, or otherwise unlawful.

Chalk (Whiting).—I. and S. No. 5155. Chalk (whiting) from New Jersey to Wisconsin. By division 3. Proposal of rail carriers parties to Agent Curlett's tariff I. C. C. No. A-723 to cancel their carload rates on chalk whiting from bayonne, Carteret, Camden, and Newark, New Jersey to Oshkosh, Wisconsin, and related Wisconsin points, and to apply, in lieu thereof, rates in accordance with column 20 rating, minimum weight 60,000 pounds, provided under exceptions to Official Classification, found unduly prejudicial to protestant. The protestant being Ira Parker & Sons Co., manufacturer of paints and putty at Oshkosh. Schedules filed to become effective October 15, 1942, and suspended until May 15, subsequently postponed voluntarily by defendants pending disposition of this case, ordered cancelled on or before September 3, and proceeding discontinued. It was stated by the Com-

"It may be of interest to you . . ."

So wrote *an old-time customer when telling us that his 40-year old Morris Centrifugal Pump is still in daily service and too good to be replaced. It may interest YOU to know this too, for it indicates the stamina that has always been built into every Morris Pump. Whatever may be your pumping requirements, be sure to investigate Morris Pumps—they will give you high efficiencies and long troublefree service. Bulletins on request.*



Morris
Slurry Pump

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BALDWINSVILLE, N. Y.

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ESTABLISHED 1864

EXPORT OFFICE:
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CENTRIFUGAL PUMPS

mission that under the suspended schedules the present rate of $5.34 per net ton from the New Jersey origins named to Oshkosh would be increased to $7.20, but that no increases were proposed in the rate of $5.12 in effect on chalk whiting shipped from Bayonne to Chicago manufacturers who are competitors of the protestant.

Lime Minimum Lowered

On August 12 the O. D. T. authorized the railroads to accept shipments of lime in 60,000 pound cars, when packed in containers. The minimum previous to this change, was 70,000 pounds. There is no indication, at the present time, that any changes will be made in the minimums for lime in bulk, or limestone in packages or in bulk.

Central Freight Association

Supplement No. 1 to WDA 73912. —Gravel, carload, WDA 73912, DB 3188, covering proposal to establish rate of 66 cents per net ton from Kingsville to Painesville, Ohio, is hereby withdrawn from docket, upon request of proponent carrier.

Docket 73921. — (Shipper's proposal) Crushed stone and crushed stone screenings, in bulk, in open top cars, carload. Establish on, from Spencer, Indiana, to Campbells, Indiana 72 cents; Paragon, Indiana 66 cents; Brooklyn, Centreton, Mooresville, Indiana 77 cents; Camby, Friendswood, Indiana 83 cents; Indianapolis, Indiana 88 cents.

Docket 73958. — (Shipper's proposal) Mill cinder and mill scale, carload, minimum weight 56,000 pounds. Establish a rate of $2.09 per gross ton from Jackson, Michigan, to Bettsville, Gibsonburg, Maple Grove, and Narlo, Ohio. Establish a rate of $1.98 per gross ton from these same points to Woodville, Ohio.

Docket 73974. — (Shipper's proposal) Stone, crushed, having value for construction purposes only, and not suitable for agricultural or chemical purposes, in bulk, in open-top cars, carload. Establish a rate of $1.93 per net ton from Spore, Ohio to Blue Creek and Elkview, West Virginia. Also establish a rate of $1.76 per net ton from West Columbus, Ohio to the same points. *Via* N.Y.C. (W), direct.

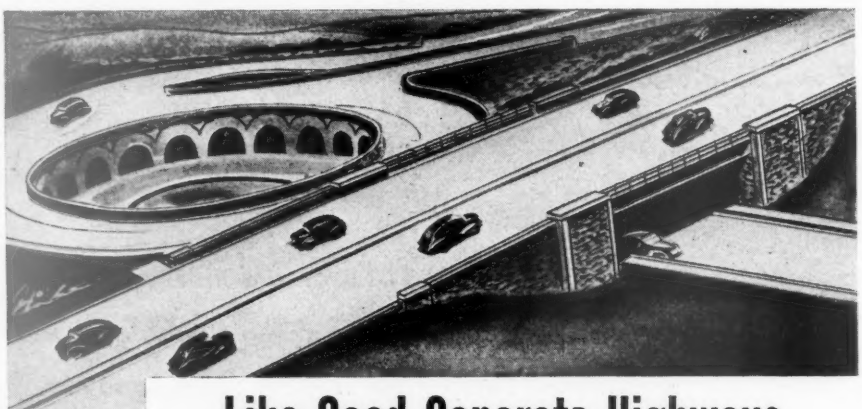
Docket 73978. — (Carrier's proposal) Roofing granules, consisting of stone, sand, slate, gravel, brick, slag or similar materials, crushed, ground or pulverized, carload, minimum weight 60,000 pounds. Establish a rate of $4.00 per net ton from Chicago to Buffalo; $6.00 to Jersey City; $5.20 to York, Pennsylvania.

Docket 74036. — (Shipper's proposal) Lime, common, hydrated, quick or slaked, carload. Establish a rate of 17 cents, minimum weight 30,000 pounds, and 14 cents, minimum weight 50,000 pounds from Port Huron, Michigan to Columbus and Massillon, Ohio.

Docket 74004. — (Shipper's proposal) Lime, common, quick or slaked, carload. Establish a rate of 18 cents minimum weight 30,000 pounds, and 14 cents minimum weight 50,000 pounds, from Port Huron, Michigan, to Canton, Ohio.

Docket 74005. — (Shipper's proposal) Crushed stone, crushed stone screenings and crushed stone tailings, in open top cars, carload. Establish a rate of 66 cents per net ton from Carey, Ohio to Findlay, Ohio, *via* N. O.—Arlington, Ohio—N. Y. C. (W).

On August 29 in a colorful ceremony at the Denver City Auditorium the men and women of the Gates Rubber Company were awarded the Army-Navy "E" pennant for high achievement in war production. The presentation was made by Col. Merle H. Davis, Chief of the St. Louis Ordnance District and was accepted by Charles C. Gates, President of the Gates Rubber Company. John C. Vivian, governor of Colorado, acted as master of ceremonies.



Like Good Concrete Highways
Norblo Costs Less in the Long Run

Without the 300,000 miles of concrete highways America could not have built thirty million automobiles. In turn the concrete highway has been a major factor in the growth of the $200,000,000 cement industry and as mills have grown in size and efficiency, Norblo Dust Collection equipment has kept in step.

The industry has consistently advocated good highway construction as lowest in ultimate cost. Norblo Dust Collection equipment is solidly based on this principle. In the long run, the saving in operating cost and maintenance is always more than any apparent but fallacious saving that can be made by selecting the lowest bid.

Norblo equipment is always fully engineered and backed up by a guarantee of performance.

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DUST COLLECTION
THE NORTHERN BLOWER COMPANY
6409 BARBERTON AVENUE • CLEVELAND, OHIO

Legal Decisions

By LEO T. PARKER

●

Restriction Upheld

Modern higher courts recognize the fact that trade secrets, confidential information, lists of customers names, and the like are valuable property. Furthermore, employment contracts are valid by which a salesman, or other employee, agrees not to accept employment with a competitor for a reasonable period in the territory in which the employer's customers or patrons are located. Generally, five years is considered by the courts as a reasonable period. For illustration, in *Briggs v. Butler,* 45 N.E. (2d) 757, it was shown that a salesman was employed under a contract which contained a clause that the salesman would not for a period of five years, from the date he left the employment, engage himself with another employer in the same or similar kind of business. The employer expended money in training the salesman who soon afterward resigned and took employment with a competitor. The record discloses that the new employer pursued substantially the same plan as that adopted and employed by the first employer, and in the performance and promotion of which contracts with business establishments as sponsors had been procured, and patrons thereof solicited. In fact contracts with several business houses were secured by the salesman for the new company within a few days after starting with new employer.

The first employer filed suit against the salesman and asked the court to grant an injunction to prohibit him from continuing the new employment. The higher court granted the injunction, and said:

"The clear purpose and effect of the contract is to prevent or at least to limit the appropriation of the benefits of information and experience secured in service with the plaintiff [first employer] and the employment thereof for his own personal advantage and to the disadvantage of the plaintiff by becoming a direct competitor, as in fact did occur in this instance. . . . For the reasons indicated we are of opinion that under the facts disclosed by the record the restrictive covenants of the contract entered into by and between the plaintiff and defendant do not impose a restraint beyond that

Amsco Dipper Aids in the Rapid Construction of Ordnance Depot

In the recent construction of a mountain-state ordnance depot, plans called for 800 concrete igloos, 60 and 80 feet in length. As the depot was urgently needed, all work was performed at high speed with the production of concrete exceeding 4,000 cubic yards a day. A huge "thermometer" showed the daily progress, and every man was determined that the best records for that class of construction would be bettered.

To load the gravel, which was available in the locality, two power shovels, one of which is shown below, were used. This shovel is equipped with an Amsco Renewable Lip Dipper. By working the faces to a height of 15 to 18 feet, the gravel was well mixed as to sizes when loaded onto the trucks which rushed it to the crushing plant.

Running true to form, the Amsco manganese steel dipper, designed for faster digging and fuller loads, gave trouble-free performance throughout the construction period.

On important jobs and where the service is unusually severe, Amsco renewable lip dippers will usually be found. Being made of tough, work-hardening, austenitic manganese steel, the greatest service life and freedom from breakage is a foregone conclusion, among power shovel operators who are acquainted with Amsco dipper features.

Amsco Renewable Lip Dippers (U. S. Patent 1,945,064) are made in all sizes from ¾ yard capacity, with bail and back lugs arranged for any type of dipper stick.

Ask for Dipper Bulletin 641-D.

Showing reinforcing ribs on lip and front which cut overall weight and give necessary shock and stress resistance.

Photo courtesy of Contractors & Engineers Monthly.

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AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois

AMERICAN Brake Shoe COMPANY

FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

reasonably required for the protection of the employer in his business . . . and are therefore valid and enforceable."

The reasons restrictive contracts of this nature are valid are: (1) because a business is built upon the confidence of its customers and the employee gains acquaintances and sells the customers by using the good will of the employer; and (2) the employer's dealings with his customers through the employee give the employee confidential knowledge that should not be divulged or used for his own benefit.

Therefore, contracts to protect the employer by restriction of subsequent employment within reasonable limits of time and territory, are permitted and sanctioned, and the court will enjoin the employee from competing in violation of his contract.

Labor-Standards Act

Modern higher courts hold that the main purposes of the Fair Labor Standards Act is to prevent the use of interstate commerce as the means of competition in the distribution of goods produced under conditions detrimental to the maintenance of minimum standards of living among the several states. For instance, in *Couch v. Arkansas Company,* 168 S. W. (2d) 822, it was shown that an employee filed suit against his employer under the Fair Labor Standards Act for unpaid wages. The important question presented to the court, and on which the decision must be made, was whether there was evidence that the employee was "engaged in interstate commerce or in the production of goods for interstate commerce."

During the trial evidence was presented proving that the employee was the night engineer at the plant. Except for a few occasions, he was the only employee who worked at night. Occasionally, he operated the machinery. Also, he sold products and materials in small quantities to those who called. Some of the materials were sold to common carriers who did interstate hauling. In refusing to hold the employer liable, the higher court said:

"Less than 1.3 per cent. of the total production of the plant was sold to railroads, for icing cars, and to refrigerator trucks. We know that the Congress did not choose to exercise its full power to regulate everything that might have even a faint aroma of interstate commerce. . . . It is hard to believe that the Congress intended to put people into interstate commerce who aid in producing anything at all which railroads consume in their business."

Whether an employee is entitled to receive wages specified by the Fair Labor Standards Act depends upon the circumstances. For example, in *Helena,* 132 Fed. (2d) 616, the question presented the court was whether an employer is subject to payment of the minimum wages specified by the Fair Labor Standards Act where only occasionally such an employee performs interstate work.

The testimony disclosed that an employee, named Johnson, is employed by an employer who operates a farm and, also, operates another business which transacts interstate business. Johnson's principal duties were working on the farm, but occasionally he performed some work, at the request of his employer, in the interstate business.

However, the testimony failed to disclose that the employer had any right to require the employee to do any interstate work nor did the employer keep a record of the number of hours worked by the employee in the interstate work. Therefore, the higher court refused to hold that the employer was obligated to pay John-

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TOMORROW'S MINING REQUIREMENTS CALL FOR THESE NAYLOR ADVANTAGES!

- Always accurate in diameter.
- Concentric ends match correctly.
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- Stays tight and leakproof.
- Stronger—safer.
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Sizes: 4" to 30" in diameter—all types of fittings, connections and fabrications.

To do your piping jobs better, easier and more economically promises to be a war by-product that will work wonders in the post-war period. The outstanding performance of Naylor light-weight pipe on the battle fronts, plus the research and development work constantly in progress point the way to the solution of many mine-piping problems in the future.

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NAYLOR PIPE COMPANY

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son minimum wages specified in the federal wage law. This court stated important law, as follows:

"That it was the intention of the Congress to include within the protection of the Fair Labor Standards Act of 1938, every employee engaged in commerce . . . within the broad scope of those activities . . . is no longer open to doubt. The act must be given a liberal construction. . . . But since the obvious purpose of the act is to establish minimum wages and (maximum) hours the law can not be interpreted to include as an employee one (over) whose hours of labor the employer has no control."

Employer Installs Blower System

Modern higher courts hold that an employer who uses ordinary care to remove dust from his plant is not liable in damages to employees who contract silicosis, bronchiectasis, or like diseases. For illustration, in *Basye v. Odom,* 168 S.W. (2d) 1092, it was shown that an employee worked in a plant about seven months in the year 1937, about the same time in 1938, nearly all of 1939 and three months in 1940. He quit work because of illness which later was diagnosed as bronchiectasis, which is a disease causing dilation of one or more of the large bronchial tubes. He brought suit against his employer to recover damages for his illness and disability. He alleged that the room in which he was required to work was filled with a fine powdery dust that completely filled the air, the breathing of which caused him to develop tuberculosis, sinus trouble and bronchiectasis, and that he did not know such dust was injurious to his health. The employee further alleged that his employer failed to exercise ordinary care in providing him with a reasonably safe place in which to work.

However, during the trial the employer proved that in 1937 he had installed a modern, up-to-date blower system to pick up or catch the dust and blow it away and that this system took care of about 95 per cent. of the dust. Therefore, in view of this testimony the higher court refused to hold the employer liable in damages, and said:

"The evidence in this record to prove that appellee's [employee's] injury was caused by breathing dust in the appellant's factory is very meager. . . . The law does not impose the burden on the master of making the servant's place to work safe or reasonably safe. If the place is not reasonably safe, still there is no liability on the part of the master if he has used reasonable care to make it reasonably safe. . . . Since the undisputed proof shows that the appellant's [employer's] had exercised reasonable care to make the appellee's place reasonably safe, they were not guilty of negligence as alleged."

Sales Tax Applicable

Considerable discussion has arisen from time to time whether a dependable legal rule is available for determining when the sale of nonmetallic minerals is taxable under a state sales-tax law. Briefly, a dependable rule is that a sales tax is collectible in the state in which the sale contracts were completed.

For example, in *Montgomery v. State Commission,* 133 Pac. (2d) 1008, Kansas, the question presented the court was whether a seller in Kansas was required to pay the state sales tax on goods sold through a special "order" department. The facts of the case are that the seller maintains a department called an order desk. This is a desk where an employee of the company assists customers in purchasing materials. The order is written on an order blank, and the customer may pay in cash

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Alert operators are reducing their bulk material handling costs by installing Continental Belt Conveyors. Continental Idlers have what it takes—they are designed and built to do a real job. They will do your job better and cost no more than ordinary idlers. Crushed stone, cement, slag, sand, gravel and similar products are being handled daily for a few cents a ton via Continental Conveyors.

Continental Belt Conveyor Idlers are made in a wide range of types and sizes for all kinds of service, so if you contemplate a new conveyor installation or the replacement of idlers on old conveyors, be sure to thoroughly investigate Continental Idlers before you write your specifications.

Write today for a copy of Bulletin ID-103 so you can better judge for yourself the superior features of this Precision Built, Streamlined, Efficient CONTINENTAL CONVEYOR IDLER.

INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

BIRMINGHAM, ALA.

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or the materials will be shipped C. O. D. The orders are sent to the seller's home office in another state from where the goods are shipped directly to the purchasers. The seller contended that the Kansas sales-tax law is not applicable because under the above explained method of transacting business the sales are not completed until the orders are accepted in Missouri. However, the higher court held the seller bound to pay the sales tax to the state of Kansas, and said:

"We have to decide whether these sales were made in Kansas or in Missouri. If the sales were consummated in Kansas then the company should have collected the tax on them and paid it to the state. If, on the other hand, the sales were consummated in Missouri they were not sales made within the state of Kansas and the company was not bound to collect the tax."

Cannot Remove Top Soil

A modern higher court has held that where a lease is made for the purpose and with the exclusive right to excavate, remove, and carry away sand and gravel and no provision is made with respect to the disposition of the topsoil and overburden, the land owner can not complain of the dumping of such material into the pit from which the gravel and sand had been removed, nor require the lessee to place it on any particular part of leased premises. On the other hand, the lessee can not legally remove the topsoil or overburden from the premises.

For instance, in Wolfe v. Licking Gravel Company, 48 N. E. (2d) 254, it was shown that a land owner and a gravel company entered into a lease contract for a designated period of years involving a certain 50-acre tract "for the purpose and with the exclusive right to excavate, remove and carry away sand and gravel."

The contract was silent as to the rights in, or the manner of disposing of, the topsoil and overburden.

The gravel company began to excavate, remove, and carry away sand and gravel and, also, removed from the leased land the topsoil and overburden. The land owner sued the gravel company and asked the court to grant an injunction to prevent the company from removing the topsoil and overburden. The higher court granted the injunction, and said:

"The authorities governing the construction of leases uniformly hold that the lessee acquires only such substantive interests in the lands as are specified in the lease itself. Otherwise, of course, the lessor would part with a greater interest than was contemplated."

With respect to where the company could dump the topsoil and overburden, the court said:

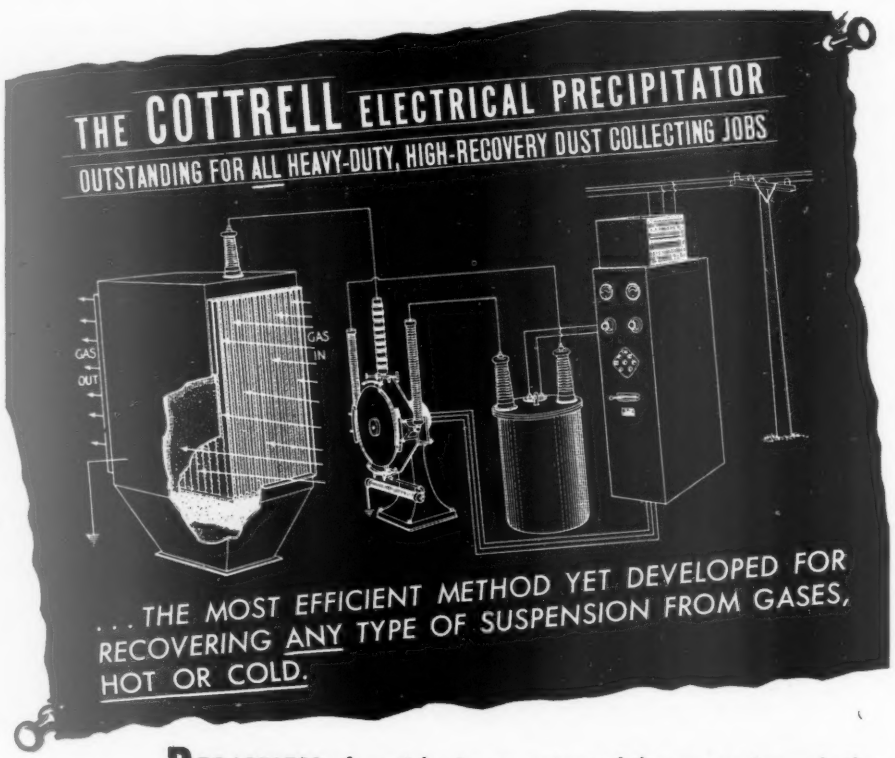
"The defendant (company) is under no obligation to put this material on any particular part of the farm or be subject to the direction of the plaintiffs as to its being placed."

Also see Percy La Salle Company v. Newman Company, 300 F. 141, in which the court held:

"In a lease granted in consideration of royalties, there is an implied negative covenant that the property shall be used only for the purposes for which it is demised, which may be enforced by injunction restraining the lessee from using the tunnels and shaft as a way for removal of the ore mined from the adjoining property."

Intrepreting Contract

In the interpretation of contracts the "ordinary" meaning of language throughout the country is given to words unless circumstances show that a different meaning is applicable. In


THE COTTRELL ELECTRICAL PRECIPITATOR
OUTSTANDING FOR ALL HEAVY-DUTY, HIGH-RECOVERY DUST COLLECTING JOBS
GAS OUT
GAS IN
. . . THE MOST EFFICIENT METHOD YET DEVELOPED FOR RECOVERING ANY TYPE OF SUSPENSION FROM GASES, HOT OR COLD.

REGARDLESS of particle size or nature of the suspension—whether dust, fog, fume, mist or smoke—the COTTRELL can be guaranteed to collect 99% or over of ALL particles entering the system. ▶ It has no filters, no screens—nothing to require frequent repair, replacement or maintenance. ▶ It handles gases at *any* temperature to 1200° F. and higher . . . in *any* capacity, even MILLIONS of cubic feet per minute . . . with lower draft losses than *any* other type of recovery equipment. ▶ And operating costs are extremely low, averaging only a fraction of a k.w.h. per 100,000 cubic feet of gas cleaned!

Whether for purification of gases, collection of "values" or nuisance abatement, a COTTRELL installation generally pays for itself within a few months—always within a a few years. Let our engineers assist you!

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view of this law no person can recover payment for either work, services or materials *not* supplied in accordance with the ordinary meaning of words used in a contract.

For instance, in Sgarlat v. Griffith, 31 Atl. (2d) 555, a subcontractor sued for extra compensation stipulated in a written excavation contract which he had with the general contractor for the erection of a building for the owner. During the trial testimony was presented proving that the contract contained a clause by the terms of which the subcontractor had agreed "to do all the excavating and all concrete work . . ." for the sum of $3,050. The contract also provided that "In excavating if rock be found which would require removal by *blasting* $1.10 per cubic yard will be paid for by measurements of the architect and certificate furnished by him."

The rock for which suit was filed was not removed by blasting but with a jackhammer, a mechanical contrivance operated by an air-compressor. The jackhammer process was more expensive than blasting and it was employed, so the subcontractor testified, because blasting might have resulted in damage to adjacent buildings and nearby persons.

In holding the subcontractor not entitled to a recovery, the higher court said:

"It is clear that the parties contracted in reference to blasting, to rock which required blasting and was to be removed by blasting. They were describing a method and they described it by using a common term known to all men. The popular, ordinary and normal meaning of blasting is a mode of rending or disintegrating rock or other substances by means of dynamite or other explosive. Any other meaning attributed to the phrase would be forced, strained and unnatural. Since blasting in that sense was contracted for and not performed the appellant (subcontractor) can not recover."

Questions and Answers

[Mr. Parker will be glad to answer questions regarding legal problems of PIT AND QUARRY readers. Questions should be addressed to Leo T. Parker, Legal Editor, PIT AND QUARRY.—ED.]

Legal Editor: In excavating for sand and gravel can we be liable for polluting water used by the municipality? We intend to construct a plant on a stream, and want to know how we stand on this point.—S. S. & G. Co.

Answer: Since you are contemplating constructing a plant, whose operation may result in controversy with the city officials over the pollution of water in the stream, the leading case of Meriwether Sand & Gravel Company v. State, 26 S. W. (2d) 57, presents unusually interesting legal information. The facts in this case are that a part of a gravel company's equipment consisted of railway tracks for the purpose of bringing the gravel in its natural state to its washing plant and delivering it at points where it might be transported to purchasers. A plurality of wells were sunk from which water was procured. The total amount of money expended in erecting and equipping its plant was a large sum. In washing the gravel the detritus held in suspension by the water flowed across the low-lying ground, and finally was discharged into a nearby stream of water.

In subsequent litigation, involving water pollution, the counsel for the gravel company argued that depositing in the stream was necessary to successfully conduct its business. Notwithstanding this argument the higher court granted an injunction against the pollution of the stream, and said:

"The pools and lakes in which the urchins and grown folks were wont to bathe are now so discolored and befouled by the foreign matter brought from the gravel plant above

WHERE 10 DAYS HAD BEEN TOPS...

these Spouts lasted 30!

THAT IS because these pulverizing mill discharge spouts have a hard-facing of Coast Metals. This protecting overlay is exceptionally resistant to the severe abrasive action of the hot clinker mixture that formerly wore out ordinary spouts in less than 10 days' service!

Easily applied by the electric welding arc or the oxy-acetylene torch to any ferrous metal including manganese steel, cast iron and chilled iron, Coast Metals hard-facing is today's wartime answer to making parts employed in tough service last longer. By keeping equipment on the job without unnecessary shutdowns for repair or replacement, it steps up production and improves plant operating efficiency.

Tell us *your* particular wear-resistance problems. Our engineers can help you.

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Plant and General Offices: Canton, Ohio
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COAST METALS
hard-facing weld rods

YOUR EQUIPMENT'S LIFE PRESERVER AGAINST WEAR

and held in suspension in the water that they are no longer clean and clear, but discolor and coat the bodies of bathers with an unpleasant slime. . . . Living water has always been deemed a valuable and desirable thing, and when that is sullied, as in this case, the injury is not slight, but substantial, and of which a court of equity will take cognizance and remedy by its injunctive power. . . ."

Of course, this decision does not mean that the company was compelled to discontinue its business. The court's decision prohibited further pollution of the water. However, the company was privileged to continue its business operations by elimination of the polluting acts. In other words, this was merely a temporary nuisance.

* * *

Legal Editor: Recently we contracted to purchase 10 cars of sand and gravel according to sample. We have used 5 of the cars and the seller has refused to take back the remainder. Can we compel him to take these 5 cars back and refund the purchase price?—F. V. R.

Answer.—Many purchasers have lost law suits that they easily could have won had they followed the rules established by modern higher courts. For example, an established rule of law is that a purchaser can not rescind any kind of contract for the sale of merchandise and recover the purchase price, unless he offers to deliver to the seller all the merchandise previously accepted under the contract. Therefore, a purchaser who sues to rescind a contract of sale must either offer to place, or actually place, the seller in the same position as he occupied before the contract was made.

For illustration, in *Evarts v. Beaton*, 30 Atl. (2d) 92, reported March, 1943, it was shown that a purchaser gave his note to a seller for $950 as full payment. The seller delivered only about one-half of the merchandise and promised to deliver the remainder within a few days. However, the seller discounted the note of $950 at a bank and refused to deliver the remainder of the goods. The purchaser sued the seller but failed to offer to deliver back to the seller the merchandise that he had received. In other words, the purchaser attempted to rescind or cancel the contract without first offering to place the seller in the position he was in before the contract was made. Although the lower court held the purchaser entitled to a rescission of the contract and repayment of the money overpaid to the purchaser, the higher court reversed this decision. In holding in favor of the seller, the court said:

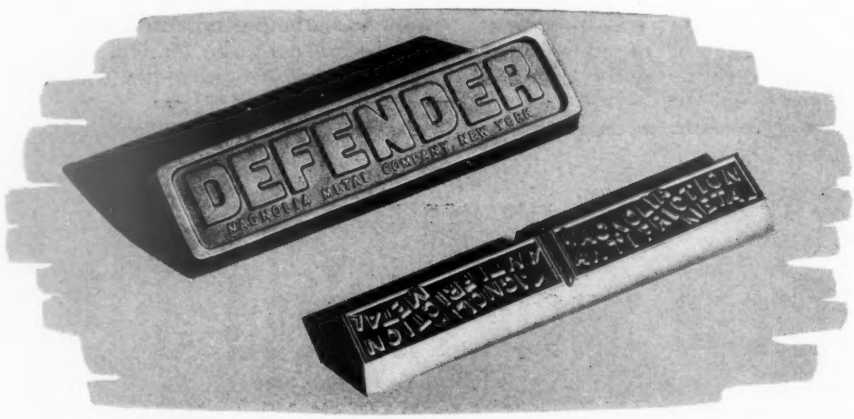
"The law is well settled that in the case of an entire contract the defrauded party, if he desires to rescind must do so *in toto;* he can not retain what he has received under the contract and thus affirm as to part and then repudiate as to the unfavorable portion of the contract."

The Army-Navy "E" award for excellence in war production has been presented in recent weeks to the following concerns:

Blaw-Knox Division, Blaw-Knox Company, Pittsburgh; Austin-Western Road Machinery Company, Aurora, Illinois; Baker Manufacturing Company, Springfield, Illinois; General Machinery Company, Spokane; Union Wire Rope Corporation, Kansas City (third renewal).

Repair parts for Clyde hydrators will hereafter be supplied by the Lime & Hydrate Plants Company of York, Pennsylvania instead of by the Blaw-Knox Company.

According to William J. Kuntz, president of the Lime & Hydrate Plants Company, the Blaw-Knox Company is advising its former customers of the change.



2 answers to

YOUR BEARING PROBLEMS

Cracked linings show the metal could not stand the sudden shock loads to which it was subjected. Replace with *Defender Metal.*

When bearing linings become worn prematurely, it is a sign of too high a coefficient of friction. Replace with *Magnolia Anti-friction Metal.*

MANY bearings fail simply because the wrong metal for the application was used in the original linings.

Magnolia metallurgists have made a study of bearing applications, and, as a result, have developed five metals, each for specific applications. For example: *Defender Metal* — a tough, malleable, lead-base alloy, designed to stand shocks without cracking—is ideal for internal combustion engines, trap rock crushers and sifter machinery. *Magnolia Anti-friction Metal*—a graphite-treated, self-lubricating alloy, having the lowest coefficient of friction of any known bearing metal (300% lower than genuine babbitt)—is used for line shafting, electric motors, winches, pumps, cement mills and general machinery maintenance.

Send for this booklet

Write for FREE 8-page bulletin which gives many helpful hints on how to keep bearings on the job, and shows which bearing metals to use for a long list of applications.

MAGNOLIA METAL CO. • ELIZABETH, N. J.

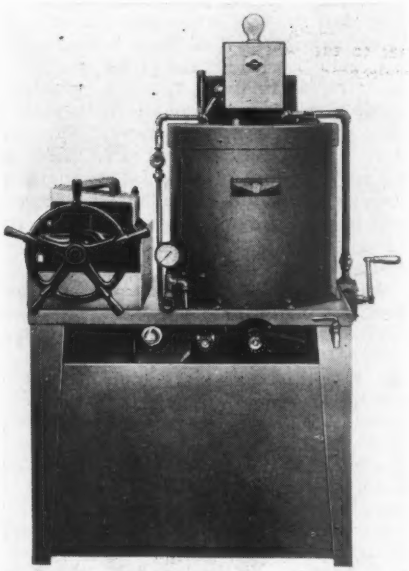
MAGNOLIA BEARING METALS

NEW MACHINERY and SUPPLIES

• Oil Reclaimer

A new small capacity lubricating-oil reclaimer, designed for small plants and organizations having their own fleet of trucks, is being manufactured by the Youngstown Miller Company, Sandusky, Ohio. In addition to reclaiming lubricating oils of the motor fleet, this reclaimer can usually handle a limited quantity of waste lubricating oils drained from equipment used in the plan or manufacturing processes.

With a capacity for purifying 8 gallons of dirty oil in 70 to 90 minutes, this Model A-8 reclaimer will handle 2,500 gallons of waste lubricating oil per year when operated only once a day. It is



Semi-automatic oil reclaimer.

pointed out that, based on average prices for the new oil, the reclamation of this quantity will generally enable the machine to pay for itself in 6 to 12 months.

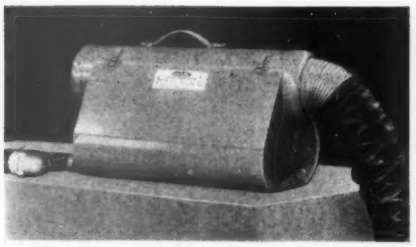
This machine has a two-stage filter press, is semi-automatic, operating under thermostatic control, and utilizes common refinery earths available on the open market. The man operating the machine can do so incident to his regular work.

For handling larger quantities of lubricating or hydraulic oils, this company builds these units in seven other sizes. All models are designed to restore used oils to substantially the same values of fire, flash, viscosity, color, neutralization number, precipitation number as the new parent oil.

• Portable Heater

Sub-zero temperatures, and even ordinary cold weather can make it pretty tough to get heavy equipment started. It is not only hard on the disposition of the man who has it to do, but it is hard on the starter mechanisms, the battery, and the motor itself.

York Heat, division of Thos. Shipley,



Preheater for internal-combustion engines.

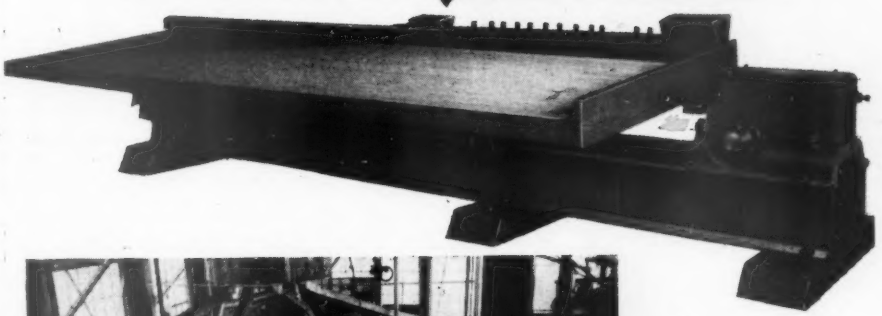
Inc., York, Pennsylvania, has developed a small, compact preheating unit for use on Uncle Sam's airplanes. It greatly speeds-up their take-off and saves a lot of motor wear. It weighs only 38 pounds and can be carried around by one man like a suitcase. It produces 90,000 B.t.u. of heat per hour and utilizes 92 per cent. of all the heat units in the burning gasoline it uses for fuel.

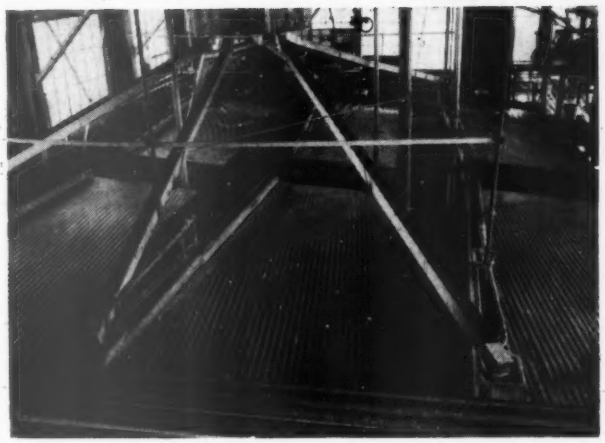
This product has an excellent application to pit-and-quarry equipment such as loaders, tractors, shovels, cranes, locomotives, portable plants, etc., where it will speed up cold-weather operations, and offer many worthwhile economies. A special booklet describing the commercial applications of this new heater will be sent upon request.

• Diesel Locomotives

Manufacture of 100 ton Diesel-electric locomotives with double power plants, the first such locomotives to be made, has been announced by H. K. Porter Company, Inc., Pittsburgh, Pa.

WILFLEY TABLES
for Closer Separation in
PHOSPHATE WASHING





Left: Six of twelve No. 6 Wilfley Tables used in a modern Florida Phosphate Fertilizer-Plant.

For food production, either animal or vegetable, phosphorus in the soil is indispensible. Modern American plants are supplying millions of tons of soluble phosphorus for fertilizer to meet that need. The above photo shows half of the table section in Phosphate Mining Co.'s new plant at Bartow, Fla. Inquiries on the use of Wilfley Tables in phosphorus washing will be answered promptly.

Marcy Ball, Rod & Tube Mills; Massco-McCarthy Hot Millers; Rock Bit Grinders; Pinch Valves; Belt Feeders; LABORATORY EQUIPMENT.

DENVER
SALT LAKE CITY
EL PASO
NEW YORK CITY

The Mine & Smelter Supply Co.

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PERFORATED METAL SCREENS
FOR SAND, GRAVEL STONE, ETC.
Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.
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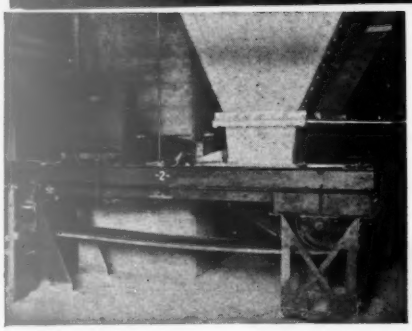
This is the Dual Purpose WEIGHING MACHINE • MERRICK FEEDOWEIGHT



Feedoweight combines in a single unit a conveyor type feeder and scale.

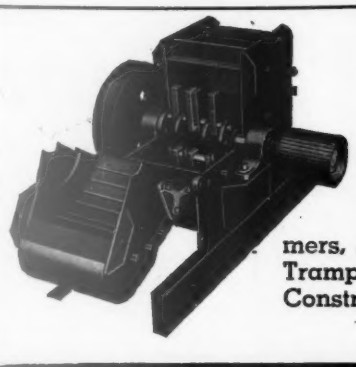
It automatically feeds the material by weight and accurately totals and registers the amounts.

Precision is assured by power-operated feed and control gate.

Two or more materials may be fed in correct proportion, by batch or continuous method, using respective number of Feedoweights.

Write for Information.

Merrick Scale Mfg. Co.
Passaic, New Jersey

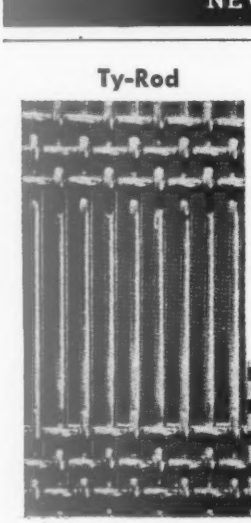


LET NEW HOLLAND HAMMER CRUSHERS INCREASE YOUR 1943 PRODUCTION ON FINER AGGREGATES AS WELL AS AGRICULTURAL LIMESTONE AND LOWER YOUR OPERATING COSTS. Features include Self Aligning Ball or Roller Bearings, Adjustable Hammers, Adjustable Breaker Plate, new design Tramp Iron Pocket and Welded Plate Steel Construction.

Write for Literature

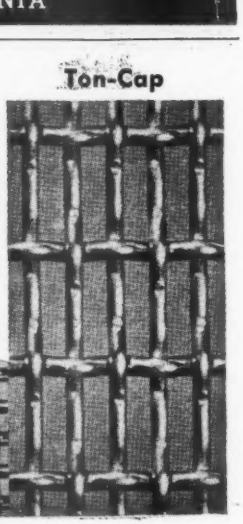
NEW HOLLAND MACHINE CO.
NEW HOLLAND, PENNSYLVANIA

Ty-Rod



THERE IS A
TYLER
Woven Wire Screen
for
EVERY SCREENING PURPOSE!
Write—
THE W. S. TYLER COMPANY, Cleveland

Ton-Cap



These 100 tonners were designed to fill demands for a powerful switching engine with advantages of economy and availability, particularly in outlying locations.

Electrc equipment is so designed that with only one engine operating the locomotive can be used efficiently; and with half a load it can travel as fast with one engine as the two engines can travel with a full load.

Besides gaining fuel economv for light jobs, the asset of being able to operate with one engine out of service is particularly valuable in remote places, or where there is only one locomotive.

The cab of the locomotive's single operating station is mounted high, giving superior visibility as compared with the single power plant type. Unusually large roomy safety platforms on each corner of the locomotive are provided for ground men.

• Groove Cutter

The rapid increase in timber construction of industrial buildings and other structures essential to the war effort has been greatly accelerated by the use of bolted ring-connector joints. This type of joint increases the load carrying capacity of timber structures, prevents bending and shearing of the bolts which often results from wind-sway, vibration and "settling" of the structure. According to the Office of War Information, it was possible to allot over 200,000 tons of steel to other purposes as a result of using wood construction and connector rings on one military construction project.

An improved tool is being produced by the Circo Tool Company, Milwaukee, for cutting the circular grooves for the rings or bearing plates. In preparing the timber for ring-connector joints, circular grooves are cut concentric with the bolt holes in the rabbetted overlapping ends of the timbers to be joined. The depth of the circular grooves is about half the width of the rings. Before the joint is assembled, the rings are inserted in the grooves on one of the joining timbers. Then, as the timbers are drawn together by tightening the through-bolts, the pro-

Tool for cutting ring grooves for timber connectors.

truding rings in one face enter the grooves in the other face. The larger bearing area of the rings utilizes a much greater percentage of the bearing strength of the wood than when bolts alone are used.

The advantages of ring-connector joining in timber construction have been known for some time but the development of this power-driven cutting tool has eliminated much of the tedious hand labor formerly required, and has speeded up this type of construction tremendously. The circular groove cutter is powered by a portable electric drill.

● Electrode

Coincident with their recent announcement of a new line of P&H alternating-current industrial-arc welders, the Harnischfeger Corporation has introduced a new all-position electrode designed especially for use with A.C. transformer-welding machines.

Suited for all mild-steel applications, it is being made in the usual sizes of 1/8, 5/32, 3/16, 1/4, and 5/16 inches, and 14 -and 18-inches lengths, packed in standard 50-pound containers. Detailed information and welding procedures are available on request from the manufacturer.

● Business Training

The Alexander Hamilton Institute is currently offering two free booklets of particular interest to production men. "Forging Ahead in Business" outlines the Institute's executive training course and service, and contains a message of distinct importance to all progressive, forward-looking men. "How to Prepare an Engineering Report" is a helpful, 72-page guide which was especially prepared for the Institute's technically-trained subscribers.

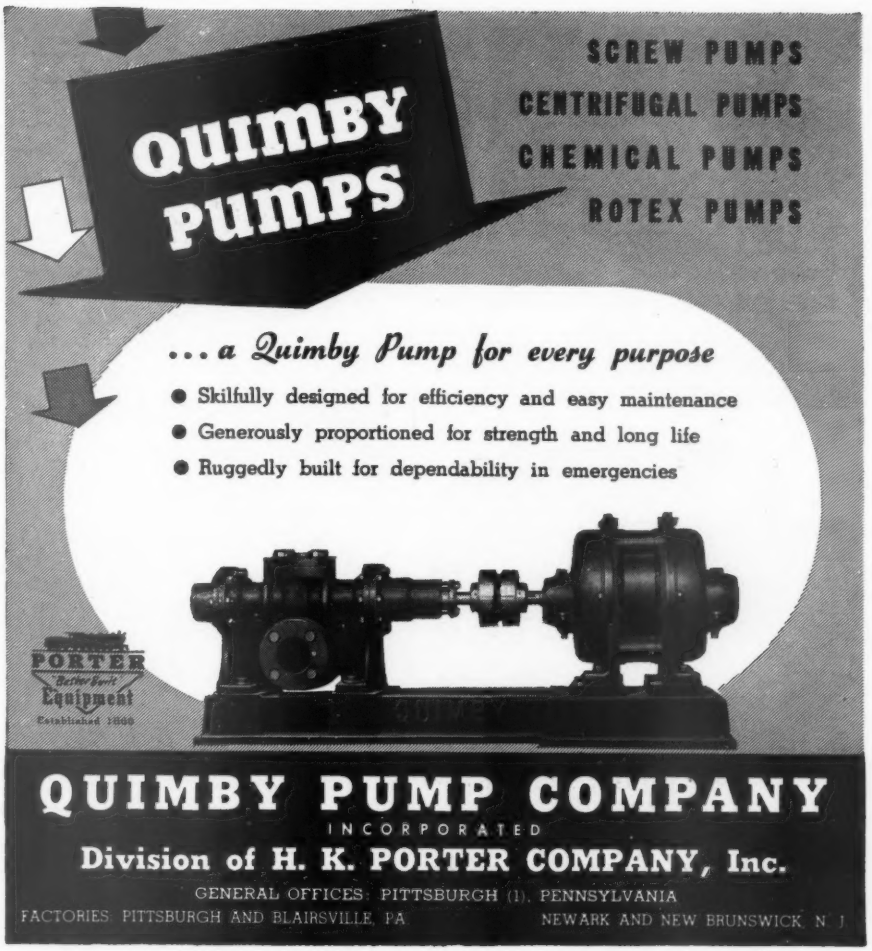
Copies may be obtained, without charge, by writing to the Alexander Hamilton Institute, Department P, 71 W. 23rd Street, New York 10, N. Y.

● Asphalt Plant

Producers of aggregates will be interested in the portable asphalt plant now being built by the Iowa Manufacturing Company, Cedar Rapids, Iowa. This unique plant, which features easy portability by truck and swift erection and knockdown, has a capacity of 3,000 or 4,000 pounds of hot or cold bituminous mix per batch.

Starting with the aggregate-drying unit, which is mounted on wheels with pneumatic tires, aggregate is carried by the hot-material elevator, inclosed in dust-proof housing, to a Cedarapids-Symons, double-deck horizontal vibrating screen. Graded aggregate falls into a three-compartment storage hopper, which has a capacity of six batches. Hopper and sizing screen are totally inclosed in steel dust-proof housing. From hopper, proper proportions of material are dumped into an aggregate batcher, which is mounted on dial indicating, springless scales. The steam-jacketed asphalt batcher also is mounted on scales. Batchers empty material into a 3,000- or 4,000-pound twin-shaft, steam-jacketed, all-steel pugmill.

Electric, gasoline, or Diesel power can be used. On electric drive plants, each unit is powered by an individual electric motor. This eliminates countershafts,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SCREW PUMPS
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CHEMICAL PUMPS
ROTEX PUMPS
... a Quimby Pump for every purpose
● Skilfully designed for efficiency and easy maintenance
● Generously proportioned for strength and long life
● Ruggedly built for dependability in emergencies
PORTER Better Built Equipment
Established 1866
QUIMBY PUMP COMPANY
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GENERAL OFFICES: PITTSBURGH (1), PENNSYLVANIA
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A big mouthful with every bite
In dirt, clay, coal, gravel or ore you can rely on one of the tough, properly designed, Brownhoist buckets to take a full load with every bite. Extra large sheaves reduce rope wear to a minimum. Brownhoist Buckets are available in rope-reeve, power-wheel and link type. For prices and further facts write INDUSTRIAL BROWNHOIST CORPORATION, Bay City, Michigan. Offices in New York, Philadelphia, Pittsburgh, Cleveland and Chicago.
INDUSTRIAL BROWNHOIST
BROWNHOIST BUCKETS
GIVE MORE YEARS OF
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FARREL BACON CRUSHERS

Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants. Engineering Service.

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17 John St. New York, N. Y.

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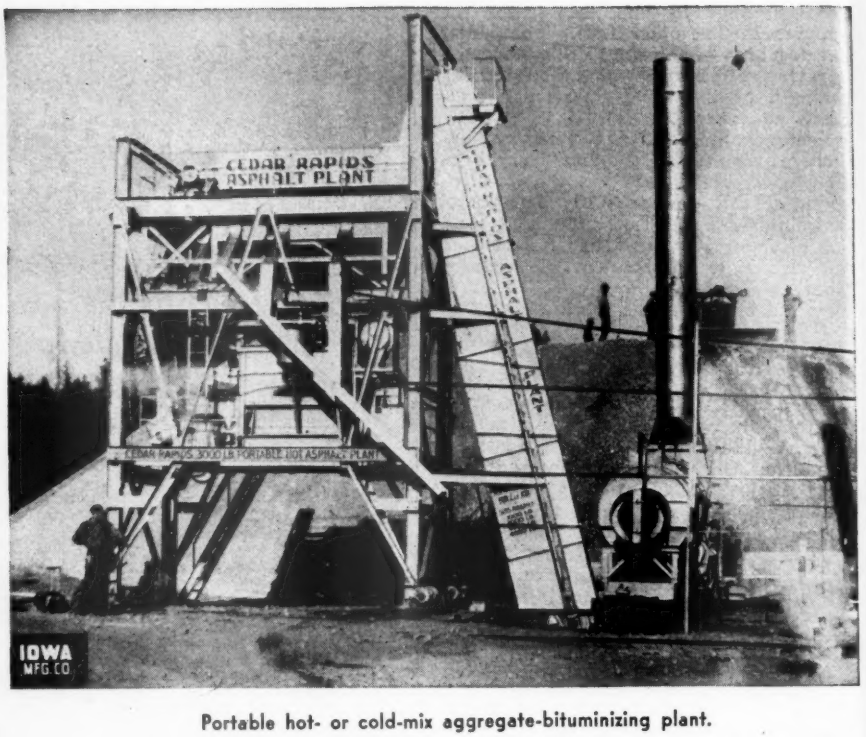
THE PATENTED DESIGN IS EXCLUSIVE AND DIFFERENT.

Screen Equipment Co.



Portable hot- or cold-mix aggregate-bituminizing plant.

bearings, chains and sprockets, permits simplicity and faster assembly and knock-down. Controls for all operations, including bin-gate levers, batchers, gate levers, pugmill discharge lever, and motor push-button switches, are centrally located on the operator's platform.

Knocked down into three units, each mounted on pneumatic-tired wheels, the plant can be transported by trucks at 30 to 40 miles an hour. On location the plant can be erected by a small crew, and without the aid of a crane, in 12 to 18 hours.

First, the screen and hopper unit is rolled into position. Tower units are laid out on the ground and assembled. By means of a power unit coupled to a cable winding drum shaft at the base of each tower, and a chain block attached to towers and bin unit, towers are hoisted upright against the bin and screen unit. Girts and diagnonals are bolted into place, completing the tower. It is then a simple matter to hoist screen and hopper unit, batcher and pugmill unit, and hot material conveyor to position. With drier in place, accessory units installed and power supplied, the plant is ready to go to work.

The system is perfectly balanced so that all units can be operated at capacity, with maximum utilization of power.

RECENT PATENTS

Combination crusher and grinder. Vernie E. Clarke, Los Angeles, assignor to Christine Association, Inc. No. 2,318,290.

Method and apparatus for trimming excavations. John M. Crom, Jackson Heights, New York. No. 2,318,294.

Feed system for grinding mill. Wilson C. Hanna, Harry E. Kaiser, and Arthur Harvey, Colton, California, assignors to California Portland Cement Company. No. 2,318,306.

Crane and shovel-boom safety stop. Albert A. Johnson, Grahamsville, New York. No. 2,318,491.

Rock drill. John C. Curtis, Claremont, New Hampshire, assignor to Sullivan Machinery Company. No. 2,318,594.

Crusher. August H. Beisner, Los Angeles. No. 2,319,290.

Tooth for excavating apparatus. Laurence Massa, Los Angeles. No. 2,319,464.

Earth mover. Ellsworth W. Austin, Cedar Rapids, Iowa, assignor to La Plant-Choate Manufacturing Co. No. 2,319,486.

IT COSTS NO MORE — TO USE THE BEST

REPLACE WITH
"Indian Brand"
MANGANESE STEEL
LONG LIFE
ABRASION
RESISTING PARTS
FOR
QUARRY, ROAD,
DREDGING,
AND
MINING MACHINERY

The Frog, Switch & Mfg. Co. CARLISLE, PA.
ESTABLISHED 1881

Trade Literature

THE MULTIVAL LUBRICATING SYSTEM. 4 pages. (Bulletin 15) Farval Corporation, Cleveland.

LIGHT FROM FLOORS SPEEDS WAR PRODUCTION. 24 pages. Universal Atlas Cement Company, New York City.

BUCYRUS-MONIGHAN 3-W WALKING DRAGLINE. 28 pages. (Bulletin 3-W-2). Bucyrus-Erie Company, South Milwaukee, Wisconsin.

IF IT'S PIPING—CONTACT FLORI. 64 pages. Flori Pipe Company, St. Louis.

GENERAL ELECTRIC GEAR-MOTORS 16 pages. (Bulletin GEA-1437D) General Electric Company, Schenectady, New York.

PHOTOSWITCH ELECTRONIC LEVEL CONTROLS. 4 pages. Photoswitch, Inc., Cambridge, Massachusetts.

HOW TO OPERATE A CRANE. 44 pages. Electric Controller & Manufacturing Company, Cleveland.

THE ABC OF ELECTRONICS AT WORK. 40 pages. Westinghouse Electric & Manufacturing Company, East Pittsburgh.

RECENT BOOKS

EMPLOYMENT IN MANUFACTURING, 1899-1939: AN ANALYSIS OF ITS RELATION TO THE VOLUME OF PRODUCTION. *By Dr. Solomon Fabricant. 362 pages. Published by National Bureau of Economic Research, New York City. Price $3.00.*

American manufacturing was far better prepared to cope with the demands of total war at the outbreak of the present conflict than it was in 1914, according to Dr. Fabricant. With a labor force only one-fifth greater than at the beginning of World War I, our industrial plants nevertheless turned out in 1939 an aggregate product twice as large as that of 1914. Improved organization, more and better equipment per worker, superior technical methods, and greater individual skills, increased use of mechanical power—all these help to account for the vast improvement during the 25-year period.

Manufacturing workers in 1939 numbered almost 10,000,000, as compared with 5,000,000 in 1899. Yet while factory jobs doubled, the output of these manufacturing industries increased fourfold. Thus, during the 40 years the number of factory workers required to produce a given volume of goods was cut in half.

This decline in unit labor requirements is the more notable in that the length of the work week was being steadily shortened over this period. Weekly hours of labor dropped from an average of about 60 per person in 1899 to about 40 in 1939. Thus only about one-third as many manhours of factory work went into the fabrication of a given quantity of goods as 40 years earlier.

In one-fifth of the many individual industries analyzed in detail in the report, the number of workers per unit of product was cut by 70 per cent. or more over the 40-year period. Heading the list is automobile manufacture (with an 88 per cent. decline), followed by industries as diverse as beet sugar, silk and rayon goods, industrial chemicals, and blast-furnace products.

COMPANY MUSEUMS. *by Laurence V. Coleman. Published by the American Association of Museums, Washington, D. C. 174 pages. Price $2.50.*

A book whose main purpose apparently is to show the nature and usefulness of company museums, but it may serve also as a guide for people who have museums of this kind to manage.

Company museums are museums belonging to industrial corporations, commercial houses, railroads, public utilities, newspapers, banks, insurance companies, and other concerns. These museums are used for business reference and public relations. They are devoted to the history, past and current, of their parent companies and to technical matters in their lines of business.

The appendix describes 80 company museums in the United States and three in Canada.

ESSENTIALS OF INDUSTRIAL HEALTH, *by Dr. C. O. Sappington. Published by J. B. Lippincott Company, Philadelphia. 626 pages. Price* $6.50.

The health of the industrial worker has always been an important bulwark of production in peacetime. In the prosecution of mechanized warfare it becomes the proving ground for the success of the combatant forces.

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This book, by one of the leading industrial hygienists of the day, closely follows a proposed course for undergraduates in medicine. It attempts to show that industrial health goes beyond the ordinary practice of curative medicine and surgery in industry. It is a timely book, bringing to all who have an interest in raising and keeping industrial-health standards at a high level, the much needed fundamentals so vital today and which promise to become even more important in the post-war period.

MINERALS IN WORLD AFFAIRS, *by T. S. Lovering. Published by Prentice-Hall, Inc., New York City. 394 pages. Price $5.35.*

The part minerals have played in world affairs—their influence on social and economic conditions that breed wars and that affect decisions in these wars—may not be immediately apparent, but it is often real and profound. Specialists have studied the role of minerals in many fields that bear on the past and future activities of man. With few exceptions, however, writers have confined themselves largely to a narrow and specialized approach.

The author, who is professor of economic geology at the University of Michigan, has coördinated the broad subject in this new work. The results of his surveys and the conclusions drawn cast a new and interesting light on mineral economics, geology and trade in the minerals vital to industrial nations.

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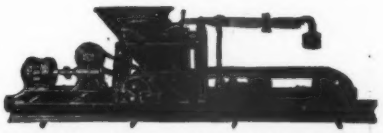

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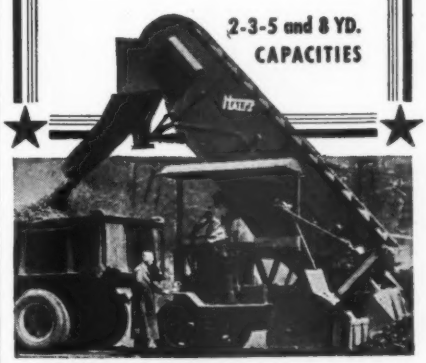

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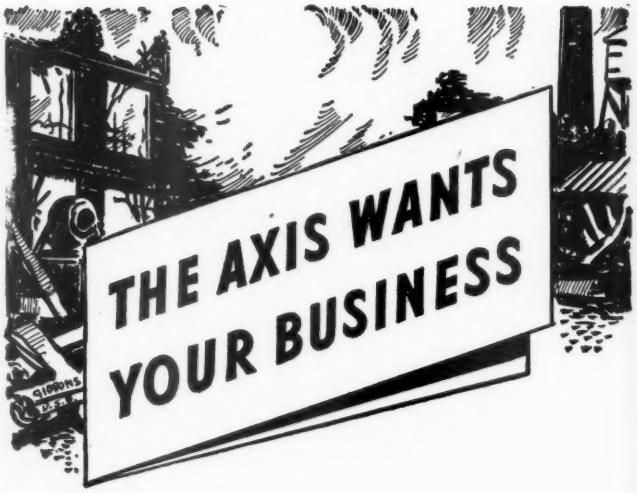

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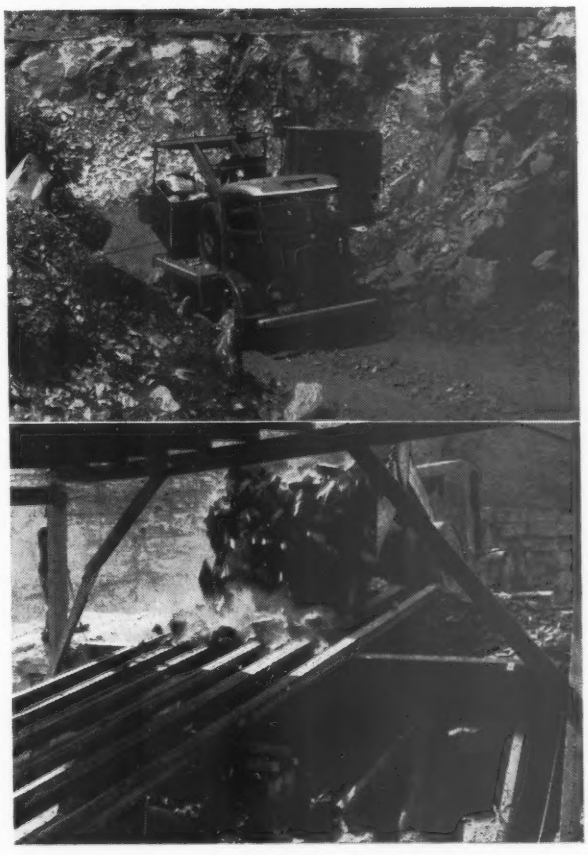

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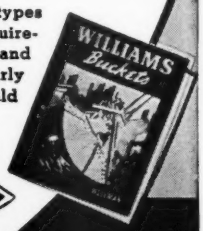

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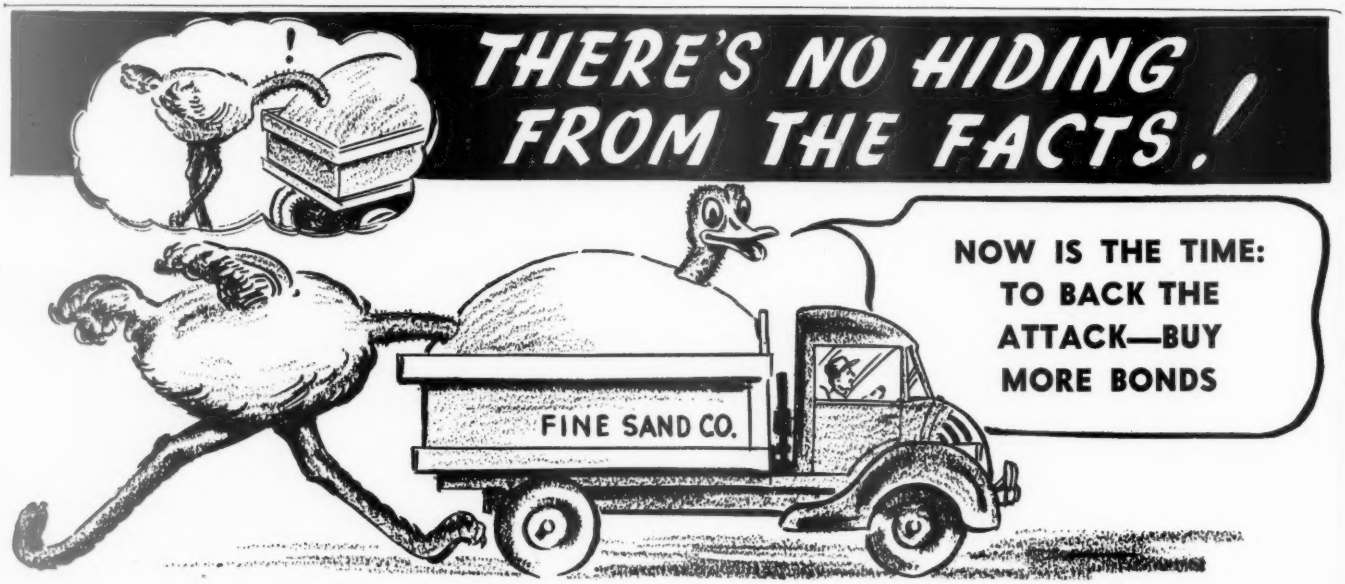

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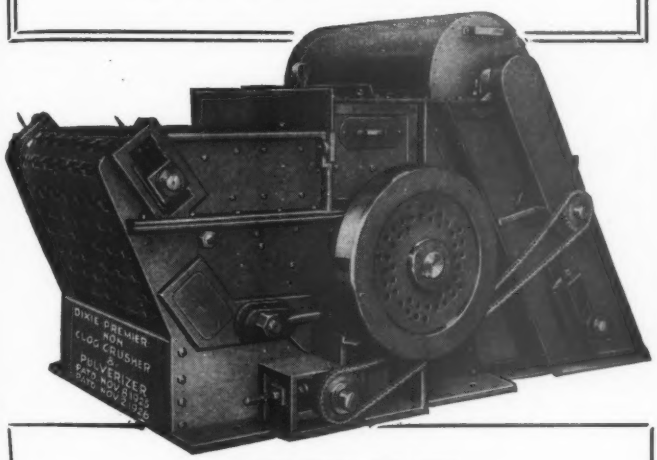

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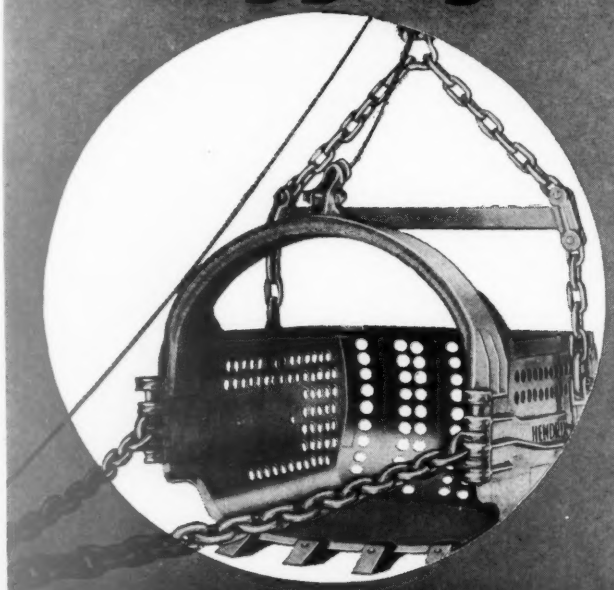

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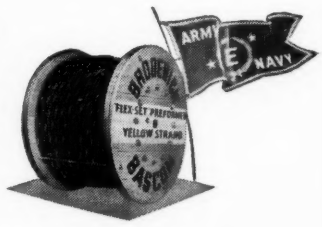

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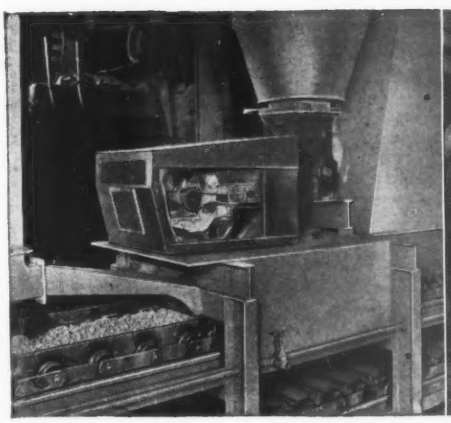

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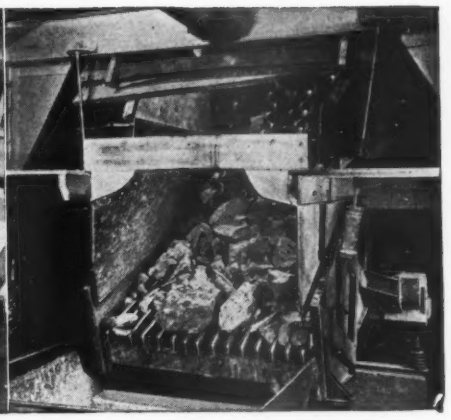
Crushing



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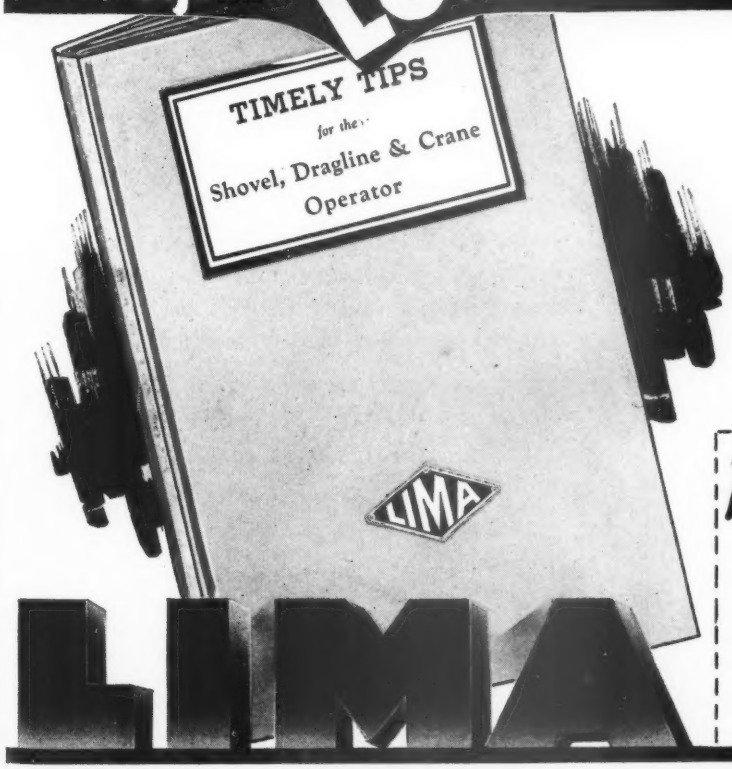

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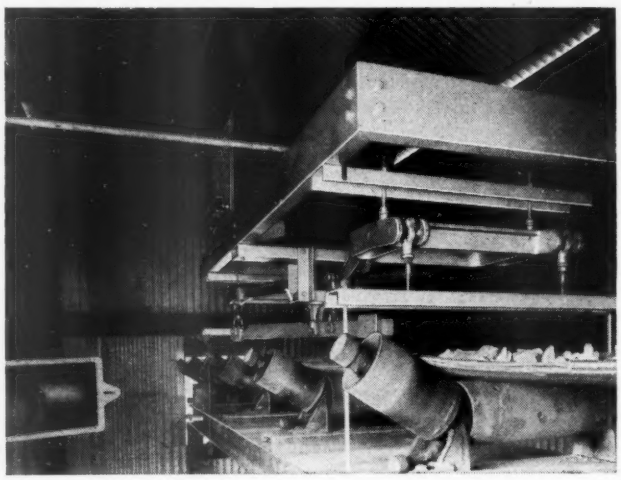

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September, 1943

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Concrete Saved Transportation Costs on This Housing Project

THE building of Outhwaite Homes, Cleveland's notable 2,315-family housing project, reveals a progressively increasing use of concrete due in large part to the war necessity for saving critical materials and conserving transportation facilities. The desire of the sponsors of the development to provide the utmost in fire-resistant construction also influenced the choice of materials. All of the concrete masonry units used for the two recent extensions of this huge project were manufactured locally, requiring only short truck hauls to the building site, according to the Portland Cement Association.

Outhwaite Homes was built in part by the PWA and in part by the Cleveland Metropolitan Housing Authority in coöperation with the USHA and its successor, the Federal Public Housing Authority, as a low-rental development for negroes. As a result of the war emergency its latest extension became largely a victory housing project on which the Federal Public Housing Authority cooperated. From the standpoint of acreage occupied, it is one of the largest public housing developments in the country.

The original project consisted of 18 buildings with 579 dwelling units on 18.1 acres. The first extension, in 1941, included 25 buildings with 449 living units occupying 14.2 acres. The second extension contains 83 buildings with living units for 1,287 families and occupies 39.4 acres of land. The 126 buildings, covering 71.7 acres in the entire project, include two-story row houses, two-story flats, three-story combination row houses and flats and three-story apartments.

Increased use of concrete construction through the various stages of the three projects, is significant. Masonry bearing-wall construction was used throughout, with floors and roofs of slab-and-girder construction. The original project had exterior walls of brick backed up with clay tile, and interior partitions of clay tile separating family units. Stair walls were of brick. Partitions in each of the original units were plaster on metal lath and studs.

Extension No. 1 was of similar construction except that lightweight concrete-masonry units were used for back-up and partitions between living units.

When work began on the second extension, authorities were urging the importance of saving war transportation facilities. Consequently all the walls of 10 of the buildings are exposed concrete masonry and 26 of the buildings have walls built in part with exposed concrete units. Lightweight concrete-masonry units are used for backup in all the other buildings and all partition walls between living units are of the same material. This use undoubtedly saved thousands of ton-miles of transportation, the concrete units being manufactured within a few miles of the project.

Similarly there was a minimum need for critical transportation facilities because concrete was used throughout the project for floors and roofs. All the dwelling unit buildings have both concrete floors and roofs. The bulk of concrete materials for the floors and roofs was available locally as is true in almost every community.

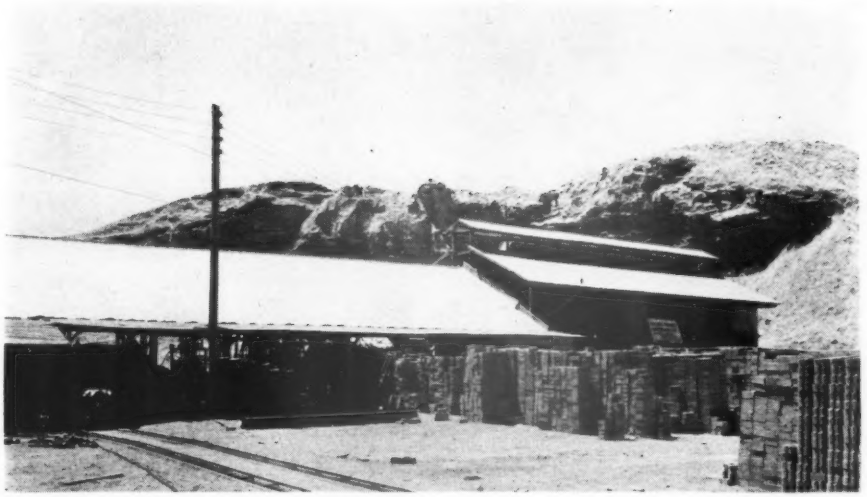
The architects on the original project were Maier, Walsh & Barrett, with the Geo. A. Fuller Construction Company as contractor. Maier & Walsh and Associates were architects on the first extension. The contractor was James McHugh.

The architects on the second extension were Small, Smith & Reeb with Merle W. Alley and Herman Dercum as associates. Maurice L. Bein, Inc., was the contractor.

Temporary Pipe Plant on Airport Project

A temporary plant is being set up near Terre Haute, Indiana, by the United States Concrete Pipe Company to supply drainage piping for a new airport.

California Pumice Producer Uses Material to Make Concrete Units



Block plant of Pacific Pumice Material Company with some of the yard stock in the right foreground.

another ON THE SPOT report

WHETHER it is due to the climate or some other reason there is no doubt that California seems to inspire people with original ideas and also the courage to try them. This has been particularly true of the concrete-products industry which, while not large in that state, nevertheless has fathered some very interesting developments.

The Pacific Pumice Materials Company of Fresno is an example. W. E. Schlink, founder and president of that company, has been

By W. E. TRAUFFER

interested in the development of pumice deposits since 1937. He has made extensive explorations of deposits in all parts of the state and now has under lease property located near metropolitan areas of California said to contain 50,000,000 tons of pumice.

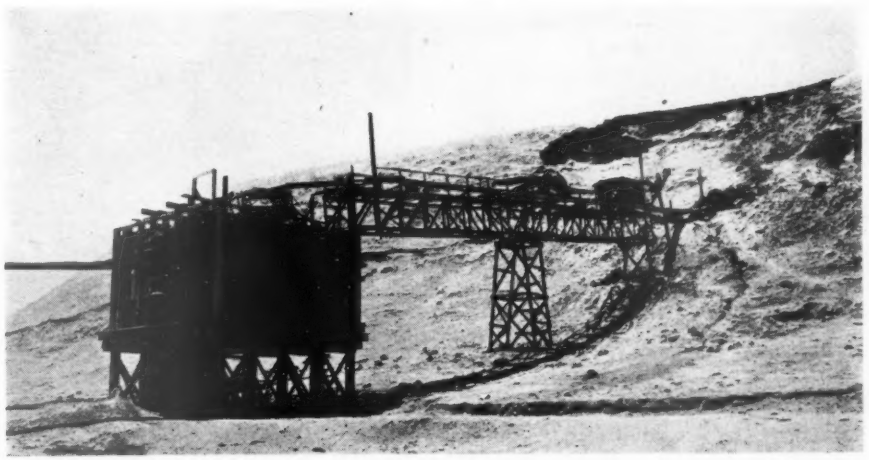
Mr. Schlink has ambitious plans for the development of these deposits and many original ideas for the use of their materials. After careful study, however, he decided to develop one deposit first, selling the product as a concrete aggregate and in the form of concrete blocks which already have a wide acceptance in this territory. An order for several hundred thousands of blocks for a military hospital at Modesto was recently completed. The deposit selected is located 12 miles north of Fresno, near Friant Dam. In 1941 he put in operation a screening plant of small capacity.

When ready to build a concrete-block plant, however, Mr. Schlink found that there were no machines on the market which would meet his exacting requirements. He had designed a complete line of blocks adaptable to every type of construction so that a house or building could be erected without requiring the breaking or cutting of blocks to make them fit every standard window or door opening. Any ordinary block machine would require frequent mold changes to make this complete line. He solved this problem by commissioning W. A. Hopper, a stockholder in the company, to build a block machine in accordance with his general specifications and to meet his needs. The resulting machine in continuous operation makes all the blocks necessary for the construction of an ordinary house without changing any of the mold boxes or cores. Its capacity is 1,000 blocks plus 1,000 ordinary bricks per hour.

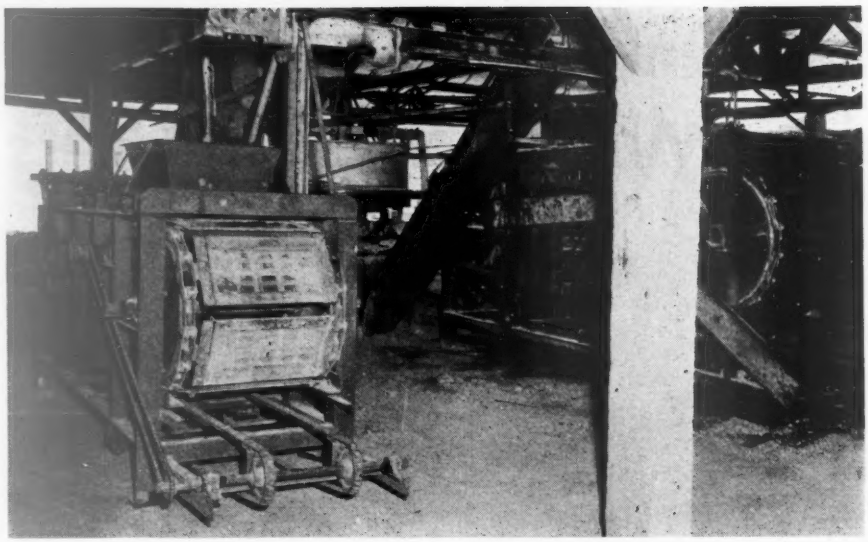
This machine has 30 separate mold boxes placed on 1-foot centers on an endless chain-conveyor. Through a ratchet drive this conveyor travels in steps of one foot each. As each mold on the upper strand of the chain passes under a hopper it is filled with concrete. As it progresses it is then troweled automatically by a reciprocating mechanism. Next it passes under a revolving brush, after which a pallet is applied by hand. A belt holds the pallet in place as the mold box passes over the end of the conveyor into an inverted position and travels back along the bottom strand of the conveyor where the concrete is subjected to a pressure of 40 tons applied by a hydraulic cylinder. At a discharge point the block is automatically ejected on a chain-conveyor which carries it to an offbearer.

The 30 mold boxes are divided among the different sizes and types of blocks so as to produce them continuously in approximately the proportions in which they are required for ordinary construction. About half are for standard 4- by 8- by 16-inch blocks. With each block an ordinary brick is also made. A mold can be changed on this machine in less than 15 minutes, but this is seldom necessary.

A smaller machine was also made.



A view at the pumice deposit with sizing plant and truck-loading bin shown.



Roofing-tile machine with large block machine at right. Concrete mixer may be seen in the background.

It has a capacity of about 4,000 blocks in an 8-hour day. This machine has four molds on a circular frame. No brush is used and the concrete is compacted by tamping instead of by pressure.

The pallets are applied at the back of the machine and the blocks are ejected automatically. It is planned

Small cylindrical block machine with its four mold boxes.

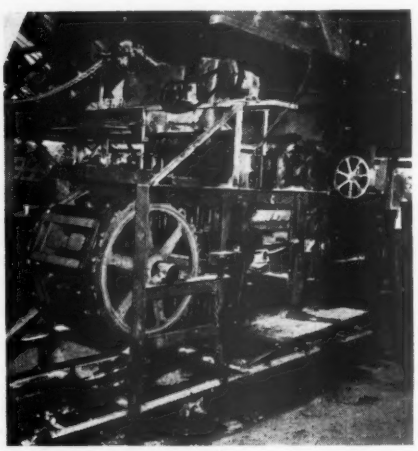
to lease machines of this type to purchasers of the company's aggregates.

A larger machine of this type has also been built for a plant at Pittsburgh, a suburb of San Francisco, but has not yet been put in operation. This machine has four mold boxes which make three standard blocks each. This machine, also, compacts the blocks by tamping. It is expected to have a capacity of about 15,000 standard blocks or 48,000 bricks in 8 hours.

At the Fresno plant, there is also a shingle machine, which has a capacity of 6,000 shingles or 6,000 square feet of floor tiles in 8 hours. This machine is nearly the same in design and operation as the block machine first described. The shingles are 10 inches wide, 18 inches long and taper from ⅜ inch in thickness at the exposed end to ⅞ inch at the butt end. They are recessed and have shoulders on the bottom side for lightness, strength and water-tightness.

The blocks are made with a 1:7 mixture of cement and aggregates, using only enough water for workability, and with practically no slump. The use of a small amount of sodium silicate keeps the absorption of the finished block at about 8.5 per cent. A 4- by 8- by 16-inch block weighs about 14 pounds and the compressive strength averages about 1,600 p. s. i. of gross area and 2,800 pounds net.

The mixing for these three machines is done in a vertical cylindrical mixer of original design. A drag-conveyor carries the concrete

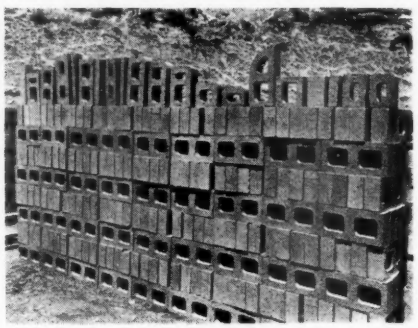


The main block machine with endless-conveyor type of mold boxes. Those being used when this picture was taken make one block and one brick simultaneously.

to another conveyor from which it is discharged into the desired machine.

The finished products are stacked on their pallets and are pushed along a roller-conveyor to sheds, where they are spray-cured for 24 hours. They are then moved out-of-doors and removed from their pallets into piles, covered with sacks and sprayed until thoroughly cured.

The deposit consists of 840 acres varying from 30 to 90 feet in depth and is said to contain every known



Illustrating (top row) the variety of units that can be made successively without changing mold boxes on the larger machine.

type of commercial pumice. Most of it has a high silica content, ranging from 70 to 80 per cent. It is loaded by a shovel into trucks, screened, and discharged into bins for truck-loading. The sizes of material produced vary according to the demand but range from minus-16-mesh up to ¾- to 1-inch. The block plant uses a 40-mesh to ¼-inch pit-run material with the oversize scalped out and some of the fines washed out. In order to control the gradation fine material is added at the block plant.

Much of the output of pumice is sold to the usual outlets as an admixture for pozzuolanic and other cements, for abrasives, scouring compounds, etc. Some of the newer uses include an insecticide carrier for crop-dusting, and concrete aggregates. The fine products are made after the materials suitable for aggregates are screened out.

The company has experimented with the use of pumice concrete in low-cost housing, using slip-form construction. This market seems to have possibilities because, in addition to its other advantages, the cost of a pumice concrete house is said to be less than that of a wooden house. The material has high insulation qualities and durability, is fire- and termite-proof, nailable and needs no fur strips or brown coat. A few coats of cement paint on the exterior of a wall will, it is said, make this concrete completely waterproof.

Crushed Burned Clay Utilized in Manufacture of Concrete Blocks

Steam shovel loading broken burned-clay waste from pile to truck.

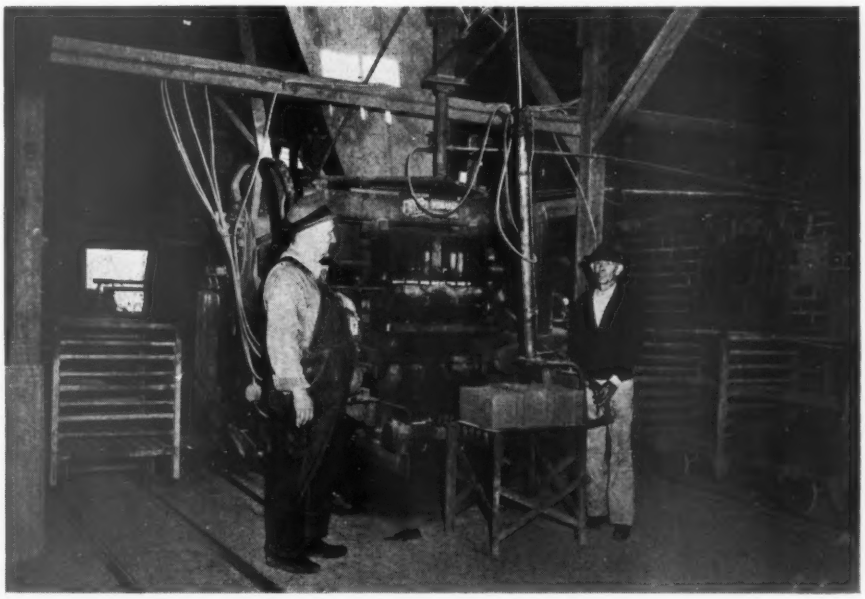
WHEN a clay-products manufacturer goes into the concrete-block business it is usually for competitive reasons. This was not the main reason, however, for the entry into this field of the B. Mifflin Hood Company of Daisy, Tennessee, a small town near Chattanooga. This company was established in 1916 for the manufacture of all types of burned-clay products, including building and roofing tile, brick, acid or condensing rings and many other types of specialties. The specialty business proved to be so prosperous that the making of building blocks and bricks was dropped some years ago. Now production in the company's three plants is concentrated on roofing and floor tile, turpentine cups, rings and other specialties.

The 9-foot dry pan which crushes the clay into sizes suitable for aggregate.

During all these years the normal breakage in this business caused a waste pile of thousands of tons of this red burned shale. One possible way to use this material seemed to be in the manufacture of concrete blocks, so about four years ago experiments were begun with a small tamper machine of original design. This experiment worked out so well that a Besser Super Vibrapac machine was installed early in 1941. Since then the plant has operated at capacity most of the time and it was operated two shifts daily early this year to supply several hundred thousand blocks for a large war-plant project.

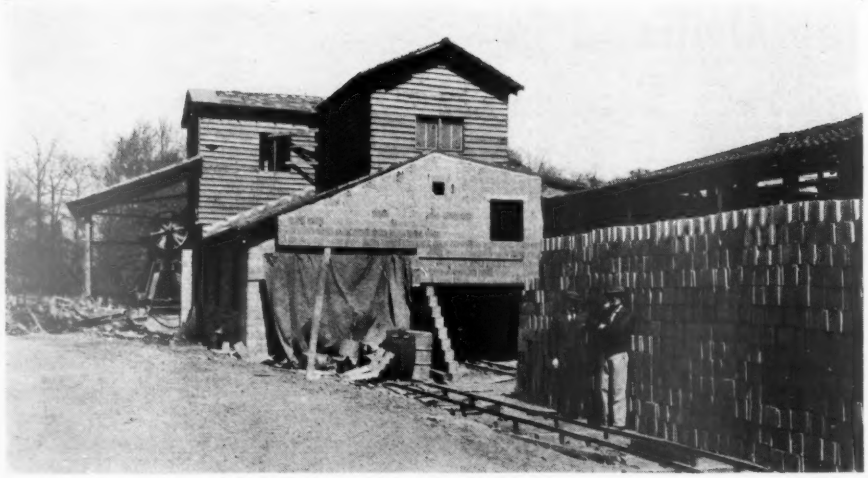
The red color of the burned-clay aggregate imparts to the finished blocks a reddish tone which has proved popular, especially for residential construction and for foundations. Much of it is used for exposed work or is coated with transparent or waterproof paints. The mix used yields 24 standard 8- by 8- by 16-inch blocks per sack of cement and a strength of from 1,500 to 1,800 p.s.i. is obtained. The absorption is from 8 to 10 per cent. Only for the above-mentioned war contract was a different aggregate (Superock) used as the government wanted a grayish color for this project.

The broken clay is dug from the waste by a ½-cubic yard Erie steam shovel and is loaded into a truck which hauls it to the plant. There it is dumped into a Chambers 9-foot dry pan, which is equipped with a 5/16-inch screen. A bucket elevator feeds the material from the dry pan to a vibrating screen which has 5/16-inch openings and from which the oversize is returned to the pan. The material which passes through the vibrating screen is discharged into a hopper over the 50-cubic foot Besser mixer. A 50-cubic foot skip-bucket discharges the concrete into the Besser Super Vibrapac, which is equipped with all the latest improvements including a hydraulic off-bearer.



Blocks are made on this automatic vibration machine.

All this equipment is located in a corner of the clay-products plant. The carts, track system and curing



Plant view with Hayden P. Grant, vice-president, and G. H. Lewis, superintendent, in foreground.

rooms used for the clay products are also used for the blocks.

Each of the Manufacturers Equipment Company carts holds 18 standard blocks and is pushed on a rail system into the curing rooms. These are equipped with a Carrier humidifying system which makes possible a wide range of humidity and temperature control in the four sections of this room, an important feature in the curing of special clay products. In the first compartment the humidity is kept at about 98 per cent. and the temperature at about 100 degrees F. for concrete blocks and at a point somewhat higher for clay. In the three succeeding compartments the humidity and temperature are successively lower when concrete blocks are being cured. For clay products the same temperatures are maintained but the humidity is reduced more rapidly so that the last compartment is nearly dry. Blocks are cured in 12 hours unless high-early-strength cement is being used in which case only 8 hours is required. The steam is supplied at 90 pounds pressure by a 100-horsepower boiler which also supplies the steam used in clay-products manufacture.

In addition to standard blocks all the necessary specials and manhole blocks have been made, about 12 varieties in all. The sale of these blocks is handled by the company's regular staff.

Physical Properties of Terrazzo Aggregates

A study of the physical characteristics of 77 marbles used for terrazzo aggregates was recently completed at the Bureau of Standards in order to supply data for a specification control of the quality of terrazzo chips. The samples were supplied by 24 producers from quarries operated in 12 states, and were classified as calcites, dolomites, dolomitic marbles, serpentines, and travertines. Abrasive resistence, bulk specific gravity, absorption, and toughness tests were made on the rock in its natural state, and the percentages of dust and voids, and thickness-grading tests were made on samples of No. 2 aggregate (chips passing a ⅜-inch and retained on ¼-inch mesh). A few samples, including two that were reported to have given trouble in terrazzo installations, were subjected to further tests to determine their expansion while absorbing water and contraction while drying. One sample was tested for thermal expansion over the range —24 degrees to + 60 degrees C.

Only a few samples were found to be of low wear resistance, and over half should be satisfactory for heavy traffic conditions. Absorption values varied over a wide range, the lowest being 0.03 per cent. for a black marble, and the highest 7.4 per cent. for a weathered serpentine. This test indicates the relative susceptibility of various aggregates to absorb staining matter. Bulk specific gravity values varied from 2.20 for a weathered serpentine to 2.98 for a dolomite. Several samples gave toughness values (resistance to impact) below 5. Samples of low toughness included the travertines and coarsely crystalline materials. This property is a measure of tenacity, and aggregates of low toughness show a tendency to form appreciable amounts of dust in the shipping containers.

The spaces between chips (voids) have a bearing on the actual volume of stone in portions measured for mixing. The percentage of voids is affected by the shapes of the particles as well as by their grading from fine to coarse. Aggregates in which the shapes of the particles are nearly equidimensional have voids as low as 40 per cent. whereas aggregates containing many flat or elongated chips have voids over 50 per cent. When portions of aggregate are weighed to obtain the mix proportions (usually 1 part cement to 2 parts aggregate), the corresponding volumes may vary considerably. A given weight of a light aggregate having high voids may differ in volume from that of the same weight of a heavy aggregate having low voids by as much as 30 per cent. The percentage of voids in a well-compacted aggregate is from 3 to 5 per cent. less than when portions are measured without compacting.

A test was devised to separate samples of No. 2 aggregate into four fractions with respect to particle thickness. The results show characteristic differences between aggregates that are not indicated by other tests. One aggregate reported to give frequent trouble in terrazzo floors was found to have over 80 per cent. of particles less than $\frac{3}{16}$-inch thick. Terrazzo mixtures are usually made with an excess of cement paste and rolled, after placing, to remove the surplus. It seems likely that the shapes of the chips may have a pronounced effect on the amount of paste that can be removed by rolling.

One sample expanded considerably during the absorption of water and contracted a similar amount in drying. The change was approximately equal to that accompanying a 70-degree C. change in temperature. The thermal expansion of an impure calcite was found to vary greatly over different temperature intervals and also for different directions in the stone. The highest coefficient was 0.0000087, but negative coefficients were found for one direction of measurement between 10 degrees and 25 degrees C.

New Products Concern Formed at Columbus

The Concrete Block Foundation Company was formed at Columbus, Ohio, July 21, under the direction of Peter J. Minck of that city and was chartered by Secretary of State Edward J. Hummel to do a concrete-block and general - contracting business. The company has an authorized capital of 200 shares of no par value. The incorporators, in addition to Mr. Minck, include W. L. Lehman and George L. David.

Larger-Capacity Block Machine Helps Relieve Labor Shortage

The plant and curing rooms with yard stock in foreground. At the extreme left may be seen the Universal Atlas storage-and-packing plant.

By HARRY F. UTLEY

MUSKEGON, Michigan, is in a vital defense area and manpower is at a premium. Several war-housing projects are under construction to alleviate a critical shortage of dwelling units. This program has placed a heavy demand for concrete blocks upon Certified Concrete, Inc.—a demand greater than the concern can supply because it is unable to operate at full capacity since it is impossible to hire enough help. Two men are kept busy molding the units, carting them off to the curing rooms, moving them into the yard, and mixing concrete for the next batch.

As a result the company's new No. 9 Stearns Joltcrete machine is shut down nearly half the time during the day while its attendants are busy elsewhere. The machine, capable of producing 500 standard 8-inch blocks per hour, is turning out about 2,500 units daily, being in full operation only about 5 hours out of 8. S. H. Markel, president and general manager, is thankful that he installed this larger-capacity machine last year to replace a No. 7 Joltcrete. Even running only part time, the large machine turns out nearly as many blocks as the smaller did in 8 hours of steady operation.

The block plant, which has been in operation since 1940, is located on the West Michigan Dock adjacent to the storage-and-packing plant of the Universal Atlas Cement Company. It uses cement from this plant, the sacks being transported probably the shortest distance on record—about 300 feet—from the cement plant to the concrete block plant! Aggregates are trucked in from the Ferrysburg plant of the Construction Aggregates Corporation. The finer sand is dumped on ground level near the Stearns 27-cubic foot mixer, while the torpedo sand is elevated to an overhead steel bin which feeds the mixer by a chute. The concrete batches are carried from the mixer to the hopper extension over the Joltcrete machine by a Stearns vertical skip-hoist.

After being molded the units are placed on wooden racks and rolled into the concrete-floored steam-curing rooms with Barrett-Cravens lift trucks. The storage yard has concrete-paved runways.

The mixer and skip-hoist which supply the block machine with concrete.

Both plain- and rock-faced units are made on the Joltcrete machine, a special mold-box forming two

The vibration-type machine which makes 500 units per hour. Pallet oiler at right.

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The ready-mixed-concrete batching plant.

plain-faced and one rock-faced unit in a single operation. Smaller units and "specials" are manufactured on a Kirkham vibration machine served by a small Blystone batch mixer. The company also produces Celocrete light-weight units, although gravel blocks are being made almost exclusively this year.

Certified Concrete, Inc. is also in the ready-mixed-concrete business and batches the materials in a Blaw-Knox plant adjoining the block plant. Six 2- and 3-cubic yard truck-mixers comprise the fleet, 3 being Blaw-Knox units, 2 Jaegers, and one a Chain-Belt Rex.

Mr. Markel formerly headed a building-supply concern bearing his name. He first established the ready-mixed-concrete business on the dock property in 1937 and when he disposed of the supply business three years ago, he began making blocks. Block-making was no new experience for him, however, as he had operated a small plant in connection with his building-supply business.

One of the truck-mixers "gassing up" outside the plant office.

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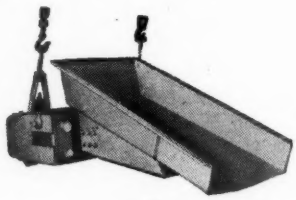

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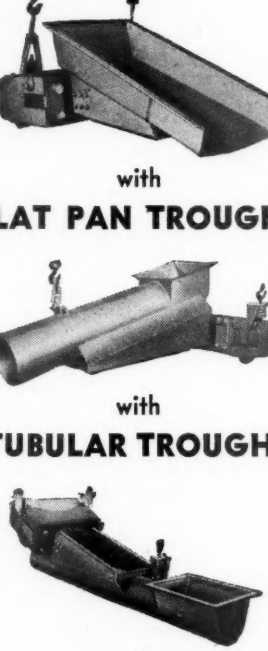

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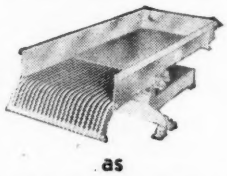

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Meetings (*from page 58*)

and widely spread employment as contrasted with highly localized types of construction. He thinks there will be some building of flight strips alongside highways and some provisions for off-the-street parking of automobiles.

The sand-and-gravel industry, according to Mr. Ahearn, still remains under the General Maximum Price Regulation and Supplemental Regulation 188. It is unlikely that the industry will be asked to operate under a special price order, since a study made by the OPA in three states did not show the need for such an order.

Mr. Ahearn then discussed the decision in the Grand Rapids Gravel Company case (see *P&Q*, May 1943, page 47) and its effect on the industry. Some employers pay the drivers of rented trucks straight time for 40 hours and time and one-half for all overtime and take care of the social security and unemployment insurance payments themselves. The total haulage rate is based on the volume of material hauled, a portion of the charge being allocated to wages and the rest to truck rental. Mr. Ahearn pointed out that leasing trucks *and drivers* from other producers makes the lessee liable for the 3 per cent. transportation tax, but this is not the case where the lessee rents the trucks only, that is, without drivers. If, however, the drivers are transferred to the lessee's payroll, the lessee must pay their social security and unemployment insurance taxes. The same rules apply, of course, to dredge or barge captains.

James Bacon, Mining Division, WPB, was present to report on changes in procedure in the handling of applications for new equipment and quota allotments. He pointed out that the new form, WPB 2910, described and reproduced on page 56 of this issue of PIT AND QUARRY, is to be used for all applications made by producers operating under a mine serial number, whether they apply for new equipment (which the form specifically mentions), or repair parts, maintenance supplies, or other material. Readers are referred to that page for a full treatment of the subject.

Mr. Ahearn reminded his listeners that sand and gravel are on the list of materials exempted from liability for renegotiation of contracts covering them in the Joint Statement on Renegotiation issued by the Army, Navy, Maritime Commission and other government agencies named in the statement.

The following persons—directors, other producers and members, and guests—were present:

James E. Bacon, War Production Board, Mining Division, Washington.
R. H. Baker, Dixie Sand & Gravel Corp., Chattanooga, Tenn.
H. N. Battjes, Grand Rapids Gravel Co., Grand Rapids, Mich.
H. R. Buchall, Ohio Gravel Co., Cincinnati.
H. P. Caldwell, Ohio River Sand Co., Louisville, Ky.
Claude L. Clark, Ohio Sand & Gravel Assn., Columbus, Ohio.
Otto S. Conrades, St. Louis Material & Supply Co., St. Louis.
R. N. Coolidge, Cumberland River Sand Co., Nashville, Tenn.
F. D. Coppock, American Aggregates Corp., Greenville, O.
H. S. Davison, J. K. Davison & Brother, Pittsburgh.
Irwin F. Deister, Deister Machine Co., Ft. Wayne, Ind.
C. S. Dickson, Standard Sand & Gravel Co., Wheeling, W. Va.
J. H. Duffy, Ohio River Sand Co., Louisville, Ky.
Alexander Foster, Jr., Warner Co., Philadelphia.
F. C. Fuller, Portsmouth Sand & Gravel Co., Portsmouth, O.
John D. Gregg, Whittier, Cal.
E. J. Halter, J. K. Davison & Brother, Pittsburgh, Pa.
G. G. Hill, G. G. Hill & Co., Dexter, Mo.
Wm. Edward Hale, American Aggregates Corp., Greenville, O.
L. L. Kelly, The Bedford-Nugent Co., Evansville, Ind.
Joseph P. Lucas, Ohio River Sand & Gravel Corp., Parkersburg, W. Va.
E. R. McMillin, J. K. Davison & Brother, Pittsburgh.
Daniel J. Miller, Portland Sand & Gravel Co., Portland, Pa.
Robert Mitchell, Consolidated Rock Products Co., Los Angeles.
G. D. Monroe, Bryan-Monroe Co., Raleigh, N. C.
H. F. Garvin Pelsue, Metropolitan Sand & Gravel Corp., Port Washington, L. I., N. Y.
T. E. Popplewell, Fort Worth Sand & Gravel Co., Inc., Fort Worth, Texas.
Stanley A. Phillips, PIT AND QUARRY, Chicago.
G. W. Renwick, Chicago Gravel Co., Chicago.
Nathan C. Rockwood, *Rock Products*, Chicago.
J. M. Settle, Ohio River Sand Co., Louisville, Ky.
Albert R. Shiely, J. L. Shiely Co., St. Paul, Minn.
C. W. Shirey, C. W. Shirey, Waterloo, Ia.
E. C. Smiith, Jr., West Virginia Sand & Gravel Co., Charleston, W. Va.
Harris N. Snyder, The Buffalo Slag Co., Inc., Buffalo, N. Y.
Frank P. Spratlen, Jr., Spratlen-Brannan, Inc., Denver.
Stephen Stepanian, Arrow Sand & Gravel Co., Columbus, O.
Ray V. Warren, Pennsylvania Sand & Gravel Assn., Pittsburgh.
P. A. Yager, River Sand & Gravel Co., Owensboro, Ky.
Earl Zimmerman, Ohio Gravel Co., Cincinnati.
V. P. Ahearn, Executive Secretary, National Sand & Gravel Assn., Washington.
Stanton Walker, Division of Engineering, National Sand & Gravel Assn., Washington.

Ready-Mixed Association Adopts Research Program

MEMBERS of the board of the National Ready-Mixed Concrete Association met for their semi-annual meeting at the Netherland Plaza, Cincinnati, on August 20.

With reference to the holding of the 1944 convention it was decided that the dates should be January 26 to 28 and the place the New Yorker Hotel in New York City. The board felt that more time should be devoted to round-table discussions and that the closing day should be set aside for operating problems.

Director of Engineering Stanton Walker discussed specifications contemplated and now in effect and pointed out some of the practical difficulties encountered in trying to give effect to the requirements of "ideal" specifications. He also presented the association's financial statement and budget.

V. P. Ahearn, executive secretary, said, with reference to price control, that the OPA is trying to eliminate the General Maximum Price Regulation and bring each industry under a special price order and, as a part of this plan, to appoint Industry Advisory Committees for all industries. The latter plan has not been completed but is under way. The association has been asked to submit the names of suggested candidates for membership on such a committee for the ready-mixed-concrete industry and as a result two members of the board of the association have already received from OPA invitations to serve in that capacity. A meeting of the committee will probably be held some time in September to consider the setting up of a special price order probably related to or in harmony with a price schedule adopted for the concrete products industry. Just what public interest would be served by the adoption of a special price order for the ready-mixed-concrete industry has not been shown.

Maximum Price Regulation 251 does not cover ready-mixed-concrete manufacturers who are not subcontractors, that is, those who do not undertake duties other than the furnishing of the concrete, said Mr. Ahearn.

H. F. Thomson, chairman of the Technical Committee, recommended to the board the adoption of a research program and the expenditure of $3,000 the first year to get it under way. Coöperative effort with the University of Maryland, where the National Sand & Gravel Association has a working laboratory and scholarship arrangement, was recommended, too. The board adopted the recommendation.

As some of the research projects that might well be undertaken under such a program, the committee

recommended a study of Vinsolresin and its effects on concrete, of grinding in relation to aggregates, volume changes in relation to the time of haul, and durability.

According to Mr. Ahearn, the ready-mixed-concrete industry is not covered by the Fair Labor Standards Act, which set up regulations regarding wages and hours for employees engaged in interstate commerce. Attempts which may be made to include it on the ground that the cement used in the manufacture of the industry's products may have been purchased from a state other than that in which the concrete is made, that the finished product is used in highways which extend from one state into another, and so on, should be resisted. It has been ruled that where cement is bought, and shipped in from, outside the state the workers who unload it are engaged in interstate commerce and that their wages for the week in which any time is spent in such work shall be based on the law's minimum-wage and maximum-hour requirements.

The speaker spoke also of the decision in the Grand Rapids Gravel Company case (see *P&Q*, May, 1943, page 47). He pointed out that companies which lease trucks and drivers from others must assume the obligation to pay the social security and unemployment-insurance taxes of those drivers, even if they work part of the time for others.

The board authorized the association staff to enlist the aid of the Bureau of Mines in the gathering and dissemination of information regarding the annual production of ready-mixed concrete.

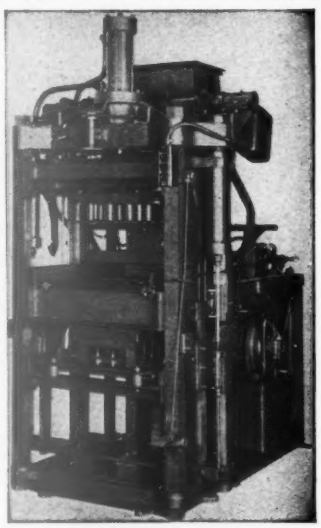
Mr. Ahearn then told of the passage in Teaneck, New Jersey, of an ordinance requiring that the manufacturers of ready-mixed concrete obtain city licenses to do business and pay a fee based on the amount of concrete furnished or laid. The license fee is $10 per year and the additional charge $5 per 50 feet of frontage of sidewalk construction, etc. The fear was expressed that this isolated instance might be the beginning of a more general application of the same idea of placing a special tax on this industry.

Other subjects discussed were the advisable procedure for handling dispute cases with local offices of the National War Labor Board, the development of industry-wide data on wages, hours, and working conditions; wage and salary adjustments under the National War Labor Board and the Bureau of Internal Revenue. Mr. Ahearn reminded his audience that ready-mixed concrete is not on the War Manpower Commission's list of essential activities.

Those present included the following members of the board, association members and guests:

A. C. Avril, Sackrete, Inc., Cincinnati.
H. N. Battjes, Grand Rapids Gravel Co., Grand Rapids, Mich.
Claude L. Clark, Ohio Sand & Gravel Assn., Columbus, O.
Otto S. Conrades, St. Louis Material & Supply Co., St. Louis.
Lion Gardiner, Jaeger Machine Co., Columbus, O.
William Goldis, The Goff-Kirby Co., Cleveland.
Alexander Johnson, Central Concrete, Inc., Brooklyn, N. Y.
A. W. Kimmel, Ready Mixed Corp., Dayton, O.
Otis H. Manchester, Concrete Transport Mixer, St. Louis.
James F. McCracken, American Builders' Supply Co., Louisville, Ky.
Ray McLean, Jaeger Machine Co., Columbus, O.
E. R. McMillin, J. K. Davison & Brother, Pittsburgh.
Robert Mitchell, Consolidated Rock Products Co., Los Angeles.
H. F. Garvin Pelsue, Metropolitan Sand & Gravel Corp., Port Washington, L. I., N. Y.
H. C. Peters, T. L. Smith Co., Milwaukee.
T. E. Popplewell, Fort Worth Sand & Gravel Co., Inc., Fort Worth, Tex.
Stanley A. Phillips, PIT AND QUARRY, Chicago.
Nathan C. Rockwood, *Rock Products*, Chicago.
Albert R. Shiely, J. L. Shiely Co., St. Paul.
C. W. Shirey, C. W. Shirey, Waterloo, Ia.
Stephen Stepanian, Arrow Sand & Gravel Co., Columbus, O.
A. W. Thomas, Chain Belt Co., Milwaukee.
H. F. Thomson, General Material Co., St. Louis.
G. K. Viall, Chain Belt Co., Milwaukee.
Julius J. Warner, Richter Concrete Corp., Cincinnati.
Ray V. Warren, Pennsylvania Sand & Gravel Assn., Pittsburgh.
V. P. Ahearn, Executive Secretary, National Sand & Gravel Assn., Washington.
Stanton Walker, Division of Engineering, National Sand & Gravel Assn., Washington.

Why not BUY
the LATEST
FASTEST
and BEST
PRODUCTION BLOCK MACHINE



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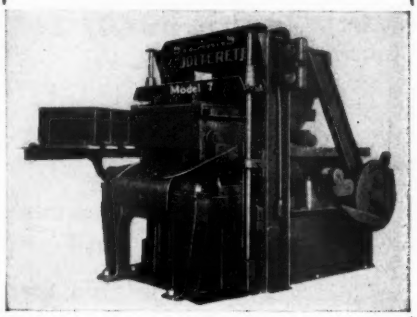
VIBRA PRESS
Write for information.

KENT MACHINE CO.
Cuyahoga Falls, Ohio

The Vibration Machine Supreme



Vibration under pressure — 7,200 blows per minute—and ruggedly built to give long life, the Joltcrete machine is the choice of the wise concrete-products operator. Produces clean-cut, high strength units in any size, and gets the most out of a bag of cement. Built in three sizes with capacities of 7 to 9 standard units per minute.

Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers and Joltcrete, Stearns mixers and Cast Iron and Press Steel pallets, Straublox oscillating attachments, etc. Repair parts for: Anchor, Ideal, Universal, Stearns, Blystone mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager — Columbus, Ohio

MORE YARDS
With Less Labor

IT costs but a few cents per cubic yard to dig, haul 100 ft. to 1500 ft. and dump a big load of any material with a SAUERMAN Power Drag Scraper or Slackline Cableway. The low cost and large capacity of these machines is being demonstrated daily at hundreds of gravel plants, quarries, etc.

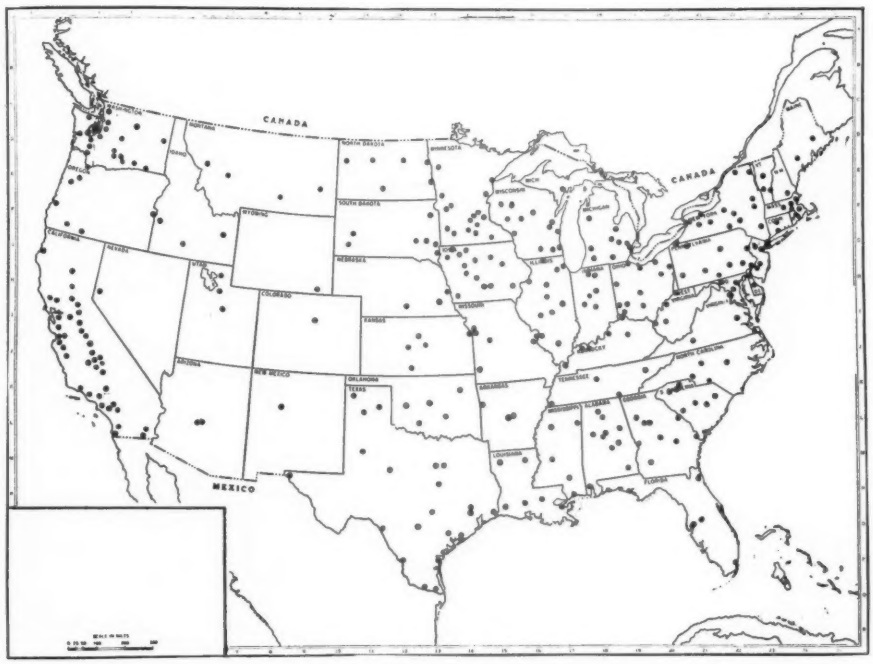
SAUERMAN Machines are designed in suitable sizes and types to cover the requirements of every dig-and-haul job and each machine, whether large or small, offers the greatest possible economy of power and labor. *Write for catalog.*

SAUERMAN BROS., Inc.
534 S. Clinton St., Chicago 7, Ill.

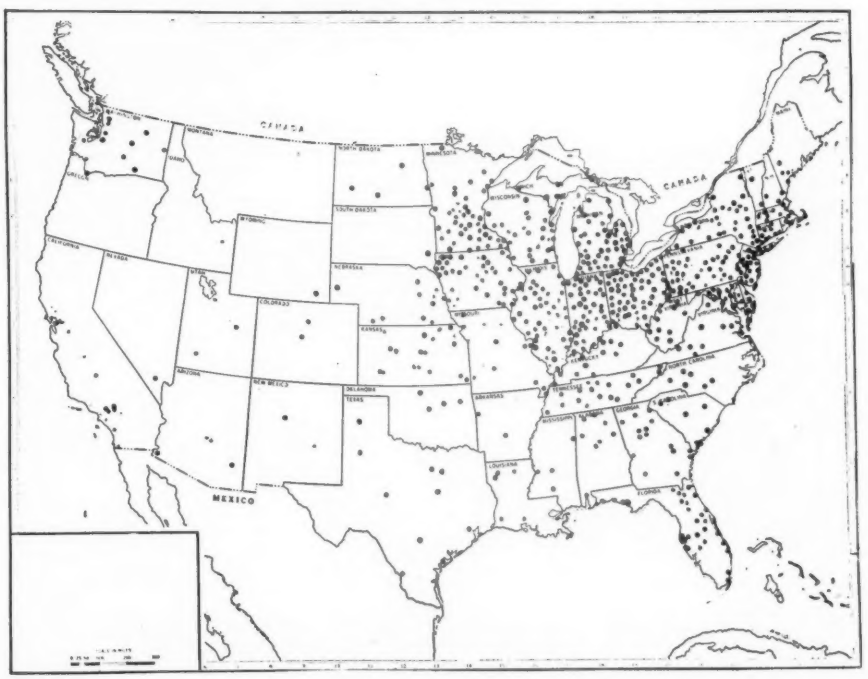
WPB Completes Survey on Concrete Products

A total of 4,581,188 tons of concrete pipe and more than 301,096,071 concrete blocks were produced in 1942, it was reported in surveys of these industries just completed by the War Production Board's Building Materials Division. The surveys were made to obtain data on the geographical distribution of concrete-pipe and concrete-block making facilities and production.

Data on concrete pipe drawn from 432 plants representing a 98 per cent. coverage of industry reveal that these plants used 112,545 tons of reinforcing steel in 1942 and employed 11,949 workers. The year 1942 was a peak production year and the majority of the plants were running at full capacity. Plants are widely distributed with some concentration in the Pacific coast states, Texas, and the eastern half of the country.



Where the 432 concrete-pipe plants are located.



Locations of the 1,694 concrete-block plants.

Figures for concrete-block production are reported in 8- by 8- by 16-inch equivalents. The 1,695 block plants reporting in the survey, representing a 75 per cent. coverage of the industry, manufacture 130,513,121 blocks made with lightweight aggregates in 1942 as compared with 151,641,073 in 1941, and 170,582,950 blocks made with heavy aggregates in 1942 as compared with 208,214,441 in 1941. These plants employed 9,251 workers in 1942. A record production was reached by the concrete block industry in 1941.

The concrete-block industry has large concentrations in the heavily populated areas, especially in the Lake and New England States and in Minnesota, Iowa, Pennsylvania, Maryland, New Jersey, and New York.

China-Clay Shipments Made from 14 States

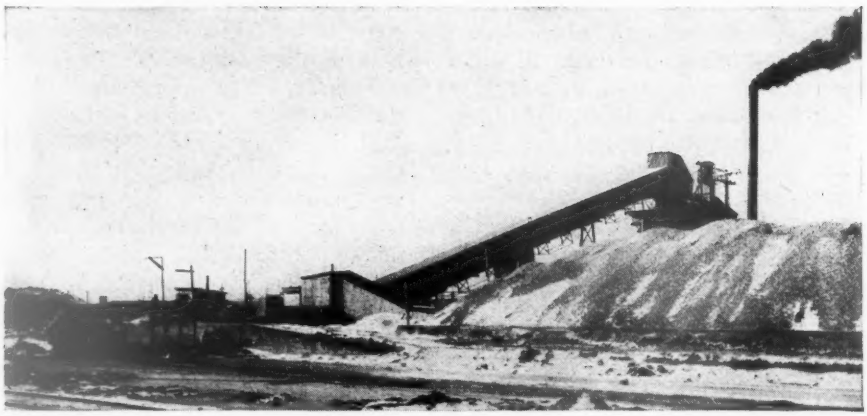
Shipments of kaolin or china clay were 13 per cent. lower in both quantity and value in 1942 than in the record year 1941, according to reports received from producers by the Bureau of Mines. Although this might be interpreted as indicating a period of recession further comparisons show that activity was at a high level. More domestic kaolin was sold and shipped in 1942 than in any previous year except 1941, 14 per cent. more than in 1940, and 45 per cent. more than the average in the years 1935-39.

Mine shipments were reported in 14 states, but most of the tonnage came from Georgia and South Carolina. Georgia, furnishing 79 per cent., contributed a greater portion of the national total than usual, and South Carolina ranked second with 12 per cent.

Outstanding among the changes in kaolin consumption compared with 1941 were the 60 per cent. reduction in its use in rubber, 16 per cent. in pottery, 8 per cent. in paper, and the 30 per cent. increase in refractories. The drastic decline in sales to the rubber industry was a direct result of the rubber shortage, but recovery in this use is to be expected if synthetic rubber technology does not require the use of materials that will displace clay.

The CONCRETE MANUFACTURER

NEARLY NEW CONCRETE BATCHING PLANT



Capacity 250-350 Cu. Yd. Per Hour . . . Available for Immediate Delivery.

Complete Butler concrete plant. Excellent condition, used only 7 months. Adaptable for either commercial or construction use where high rate of concrete pour may be required. Equipped for manual, semi-automatic or automatic operational control. See details below.

BATCHING BIN. Bin—250 yd. capacity—190 yd. 3-compartment aggregate 400 bbl. cement.

2 BUTLER CEMENT STORAGE BINS. 2,000 bbl. capacity, 2-compartment, 3,000 bbl. capacity, single compartment. All bins equipped with air jets and steam jets.

BATCHERS. 1 Butler aggregate 5 yd. capacity, complete with beam-type scale, manual operation.

1 Butler cement 3,000 lb. capacity, complete with beam-type scale, manual or automatic operation.

1 Butler water batcher 200 gals. capacity, beam-type scale, complete with 400 gal. surge tank and valves, manual or automatic operation.

ELEVATOR & TRACK SCREW. 300 bbl. per hour capacity, screw 37 ft. long, equipped for either box car or hopper car cement delivery. Complete with 20 hp. electric motor.

CONVEYORS. 1 Barber Greene 36" inclined conveyor 237 ft. long, equipped with: 50 hp. Century motor; one 40 yd. track hopper; one 20 yd. track hopper; one 20 yd. truck hopper. All necessary A frames, trusses and supports included. All hoppers equipped with discharge gates.

1 Barber Greene 36" horizontal conveyor 180 ft. long. Complete with 18 double clam-type fill valves, 20 hp. Century electric motor complete with trusses.

1 Barber Greene 36" inclined conveyor 60 ft. long. Complete with 15 hp. electric motor, trusses and supports.

All conveyors in excellent condition; two-way Alemite system of lubrication; band-type brake; pivoted distributor, ground level controlled. Conveyors operated under cover while in use. Idler take-up and return idler rollers in good shape. Extra length new 500 ft. belt available.

MISCELLANEOUS. Collecting hopper under batcher, 5 feet cement screw feeder complete with motor for automatic control of cement. Traveling hopper for charging batch trucks. Extra cement buckets, drive chain, elevator chain for cement elevator and track screw, etc.

Also 28 Late Model Transit Mixers

12—1942 Model Jaegers—High discharge, separate engine drive with two-speed transmission. 8 mounted on 1942 Dodge six wheelers, good rubber, excellent condition.

10—1942 Model Smiths—High discharge type. These mixers were used only 6 months.

Also 6 — 1938 Model Smiths — High discharge type. 3 mounted on 1938 Autocars, 2 on Macks and 1 on White truck. All single axle drive in good condition, with good rubber.

MOTOR TRUCK SALES AND EQUIPMENT COMPANY

Telephone: CALUMET 1255

2435 COTTAGE GROVE AVENUE **CHICAGO, ILLINOIS**

Paving Under Giant Crane Runway for Caterpillar Tractor Company War Plant. Photo Courtesy of Caterpillar, Peoria, Ill.

JAEGER OPERATORS WILL PROFIT FROM THIS LESSON!

War jobs like this, totalling multi-millions of yards of concrete more efficiently mixed and placed with Jaeger Truck Mixers, have fully educated the architect, engineer and contractor to the advantages of "ready-mix" service with this mobile, flexible type of concrete plant.

In coming years, operators of Jaeger Truck Mixers will profit greatly from this lesson, particularly as they continue, in spite of limitations on new truck mixers, to maintain the wartime standard of service they have already set.

Longer life has been built into your Jaegers. Your Jaeger distributor and Jaeger traveling engineers are always available to help you keep your truck mixers rolling smoothly to Victory — and beyond.

THE JAEGER MACHINE CO.

602 DUBLIN AVE.
COLUMBUS, OHIO

RECOMMENDATION 1:

Make each driver responsible for his unit. Send for Jaeger Manuals and insist on operation, cleaning and lubrication as specified therein.

RECOMMENDATION 2:

ARRANGE WITH YOUR JAEGER DISTRIBUTOR FOR A REGULAR 30-DAY CHECK-UP ON EVERY MACHINE.

War Construction Still Needs Concrete Men

Expediting the war effort is still the first duty of concrete contractors and concrete products manufacturers.

Needs for war housing and war plant improvements are not yet satisfied. Facilities for preserving and storing war foods are as urgently needed as ever. Farmers still need concrete improvements such as feeding floors, paved barnyards, and sanitary milk houses, which save labor and increase farm production.

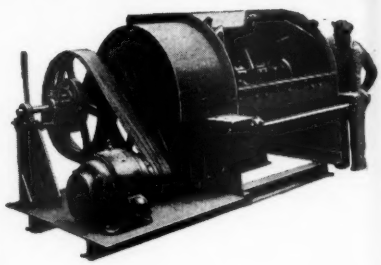
Concrete construction for any of these vital purposes requires minimum use of scarce materials. Transportation is saved because the bulk of concrete materials is usually available within short hauling distance of any project.

PORTLAND CEMENT ASSOCIATION
Dept. A9-58, 33 W. Grand Ave., Chicago 10, Ill.

A national organization to improve and extend the uses of concrete . . through scientific research and engineering field work

BUY MORE WAR BONDS

Thorough Low-Cost Mixing with MULTI-MIXER



MULTI-MIXERS are supplied in either motor drive or geared-head drive eliminating pulleys and clutches. Reverse screw-type mixing action insures better concrete. All are SKF ballbearing equipped, with double seal ring packing bearings, etc., to eliminate the entrance of dirt. Abrasive-resisting steel or chromium plated liners available. Capacities from 5 to 60 cubic feet. Ask us for the names of well-satisfied MULTI-MIXER users. *Write Today for Complete Information!*

MULTIPLEX Equipment Available

We are in position to give reasonably prompt service on all orders. However, we regret that we are unable to supply new equipment unless a priority rating high enough to permit us to re-supply ourselves with the necessary steel accompanies your order. If you will supply us with your priority rating when ordering, it will aid us materially in determining our ability to serve you.

Multiplex Concrete Machinery Company
ELMORE OHIO

Via Barber-Greene

● Securing economical distribution and compact plant design, this Barber-Greene system of conveyors was worked out to screen into three sizes. Outstanding is the fact that the three B-G stockpiling conveyors are supported out of the pile by B-G steel A-frame supports, greatly aiding reclaimation operations.

● The reciprocating feeder, four belt conveyors, and A-frames are all B-G standard pre-engineered units, selected for this construction. Our engineers can help you with your material handling problems.

Q-26

BARBER GREENE
AURORA ILLINOIS

ARE YOU SHORT of Help?

If you are busy as blazes and short of help, a Neff and Fry bin would help solve your problem. More Neff and Fry bins erected in the past 18 months than in any previous five years. How about yours? Super-stave type . . . any size . . . 1943 catalog available.

NEFF AND FRY COMPANY, CAMDEN, OHIO

NAT-ALOY WIRE CLOTH

☒ VOTE **"YES"**

For this dependable, non-crystallizing, long-wearing Screen Cloth with "Nat-Aloy" Lock Crimp Meshes.

"IT'S THE PEOPLE'S CHOICE"

among profit-wise producers for precision separation and economical operation.

Stock shipments in all widths and all meshes. . . . Write for catalog No. 55.

NATIONAL WIRE CLOTH CO., INC.
252-270 W. FAIRFIELD AVE. — ST. PAUL, MINN.

Join the SMITH-MOBILE Parade!

Ready Mixed Concrete Operators Everywhere Stick to Smith-Mobiles

After putting their first Smith-Mobile through its paces, users invariably come back for additional Smith-Mobiles. As a result, many a fleet today is 100% equipped with this modern, dependable truck mixer.

Owners instantly recognize Smith-Mobile's many superior features . . . the HIGH DISCHARGE without hoist . . . the CONTROLLED DISCHARGE without segregation . . . the VISIBLE MIXING feature . . the successful REAR END CHARGING . . . the Smith way of introducing water through the feed opening. They appreciate Smith-Mobile's GREATER SPEED and EFFICIENCY.

So play safe! Standardize on Smith-Mobiles. Ask for Catalog 198-B.

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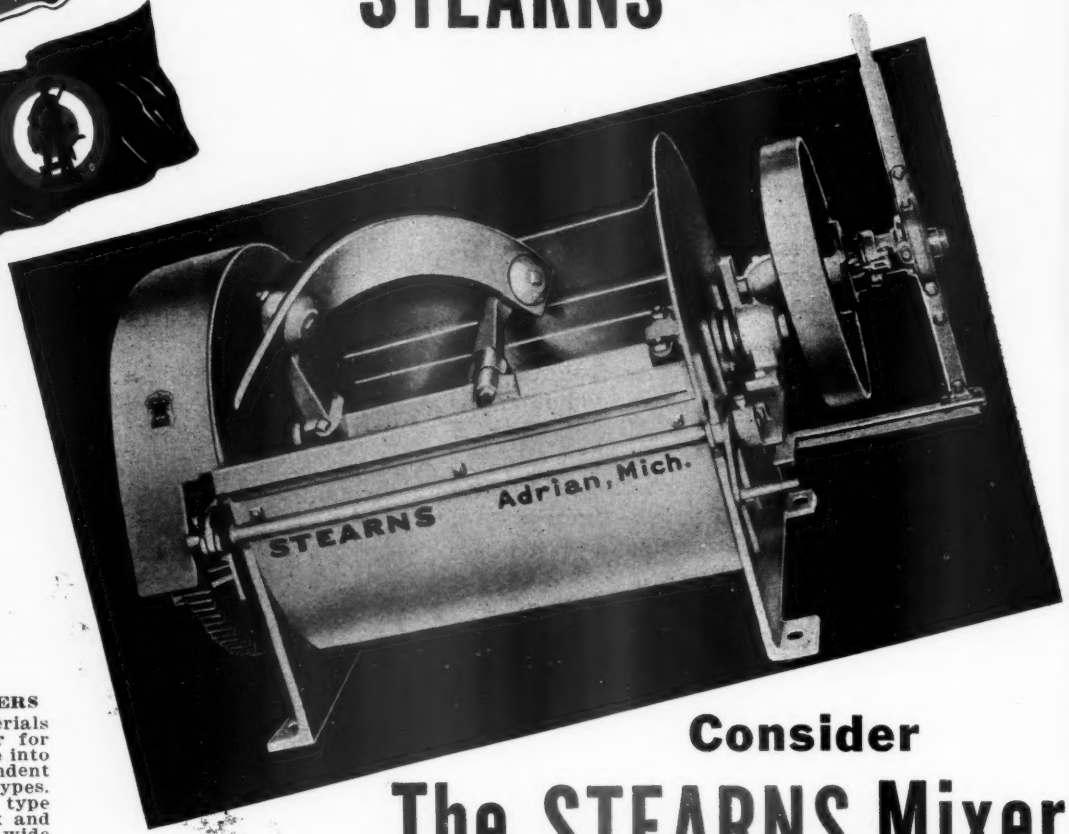
THE *Modern* TRUCK MIXER and AGITATOR

A 4132-1P

First in our field to win the Army-Navy "E" award and the Treasury Bullseye flag — signal honors that make us humbly aware of our responsibilities.

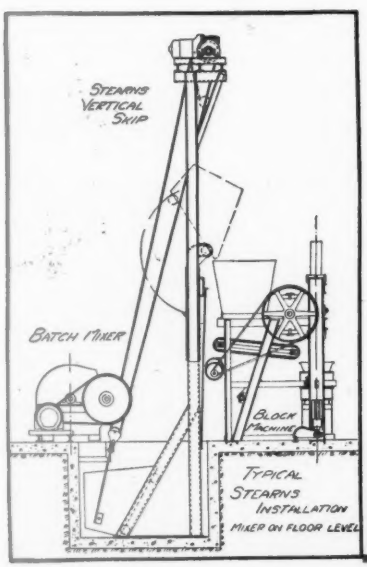
Accomplishment, Skill and Integrity

are reflected in all STEARNS EQUIPMENT



STEARNS SKIP LOADERS

For charging dry materials into elevated mixers or for elevating mixed concrete into feeding hoppers. Independent motor and mixer drive types. May be used with any type of mixer. Proper track and cable lengths permit wide range of application. **Write today for descriptive literature.**



Consider The STEARNS Mixer

with its bar-type liners (tough—easily and cheaply replaced); its sturdy, expensive type clutch; and its oversize, dust proof ball bearings.

STEARNS mixers really *mix*—thoroughly, quickly. Mixing blades are of ribbon type "Sterloy". Mechanical controls are arranged to save man power, waste motion. Bag shelf and spill gate are just the right height. Spill gate opens smoothly, quickly—locks tight—*won't leak.*

Pulley, V-belt or gear-head motor drive. Available in 3, 12, 18, 28, 42 and 50 cu. ft. sizes. *Write for covering literature.*

STEARNS
MANUFACTURING CO. - ADRIAN, MICH.
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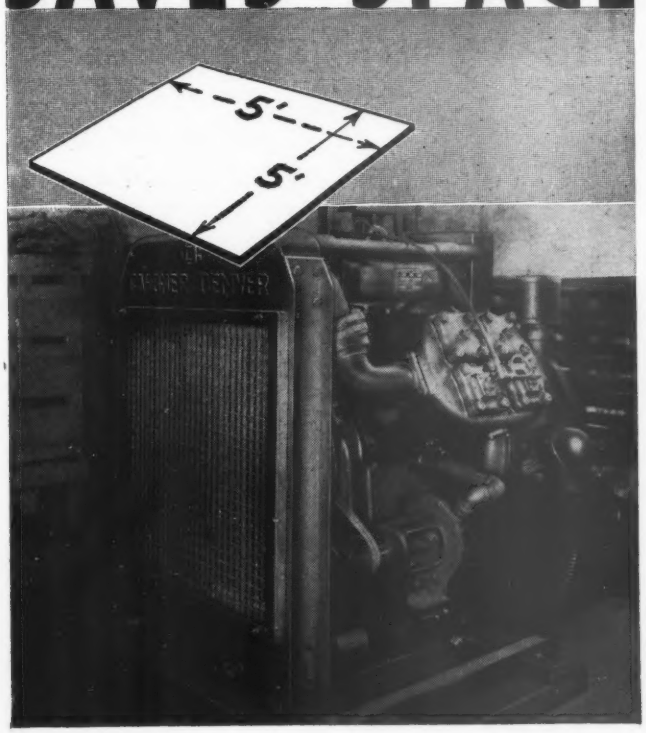
Also manufacturers of Joltcrete Vibration Block Machines and tamp type block and brick machines. Licensed under basic Gelbman Vibration patents.

SAVES SPACE



BUT INCREASES CAPACITY

IN A SPACE 5 feet square, Gardner-Denver "WB" Vertical, Two-Stage Air Compressors provide greater air capacity. For these compressors are designed for compactness—yet they operate with efficiencies comparable to those of large, horizontal compressors.

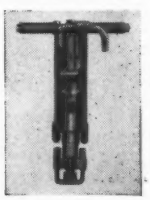
Fully water-cooled construction means lubricating oil economy—as well as cooler temperatures in your air lines.

For getting close to the work, compressor and drive may be skid-mounted and moved from place to place as different areas of the deposit are drilled.

Furnished for any type of drive—including direct motor-mounting or sheave for "V"-Belt drive—Gardner-Denver "WB" Air Compressors are built in capacities from 142 to 445 cubic feet displacement per minute.

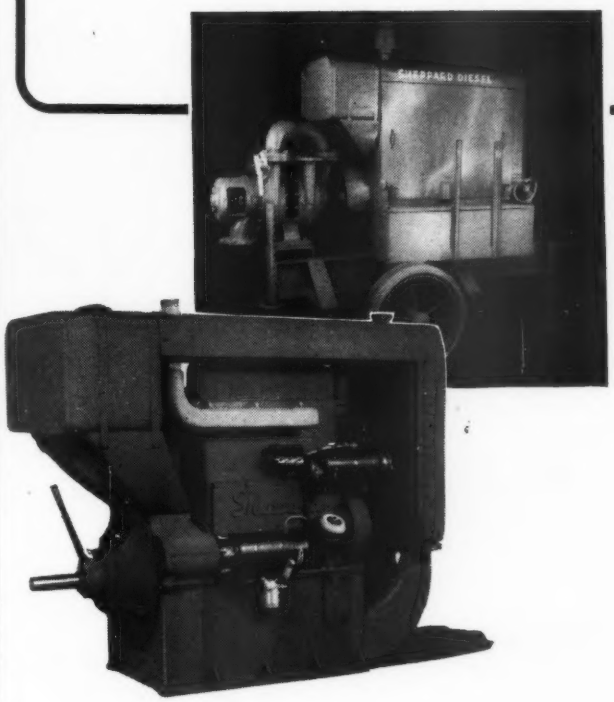
For full specifications, write Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER *S-73 Sinker—67 pounds of speed and power for faster drilling.*



GARDNER DENVER *Since 1859*

Carver Pump Uses Sheppard "Packaged Power" for Low Operating Costs



When Carver chose a power unit for their 350 g.p.m. 2-stage centrifugal pump, the choice was a Sheppard Model 6A 3-cylinder All American Diesel because (1) it guarantees their customers low operating costs and (2) it protects the Carver reputation as a manufacturer of dependable equipment.

Other leading construction, mining and refining equipment manufacturers install Sheppard Diesels because of their dependability and ease of installation.

The Sheppard continuous duty Diesel uses only 2/3 as much fuel as a gasoline engine generating the same H.P. ...and at a fraction of the cost per gallon of gasoline. This efficient, trouble free engine is complete with radiator cooling, battery starting and clutch power take-off.

Look for Sheppard Diesel in any equipment you plan to buy. Write to Sheppard for further specifications and data on Sheppard "Packaged Power."

R. H. SHEPPARD COMPANY, Hanover, Pa.

"Packaged Power" Sheppard ALL AMERICAN Diesels

YOU'RE RIGHT ! ! !

when you install SIMPLICITY GYRATING SCREENS. You are guided in your selection by overwhelming proof of superior performance and economies due to the Positive Action—Rubber-cushioned Power—Low Upkeep—Ruggedness —Elimination of Blinding, etc. No job too exacting for the SIMPLICITY GYRATING SCREEN—It is backed by result records that mean better profits regardless of service requirements.

Rewashing Gravel over 3' x 6' Single.

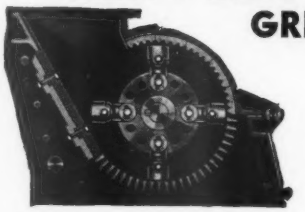
Simplicity Engineering Co.

DURAND . . . . . MICHIGAN

GRUENDLER CRAFTSMANSHIP

Employed by U. S. A. in the WAR EFFORT

HEAVY DUTY CRUSHING and GRINDING EQUIPMENT



for—Heavy Ores, Chemicals, Bauxite and ROCK Products

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Gruendler Features:

MOVING TRACK BREAKER PLATES
For Wet, Sticky Materials.

TRAMP METAL CATCHER
Full Protection to Crusher.

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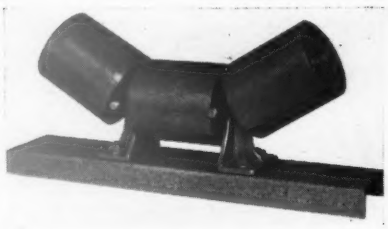
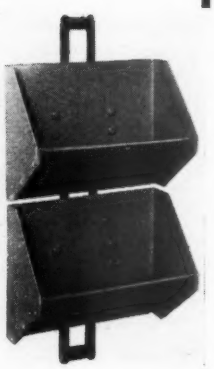


Columbus Belt Carriers and Idlers with anti-friction bearings

YOU *need* US!

The Columbus Conveyor Company—with a quarter century of experience—is prepared to engineer and build complete plants for sand and gravel, lime, gypsum, cement or crushed stone or other materials.

You can also obtain individual equipment or parts, and you are assured of efficient service on small orders for buckets or similar items.



Continuous Type Style "C" Steel Elevator Buckets

Write for Catalog No. 155

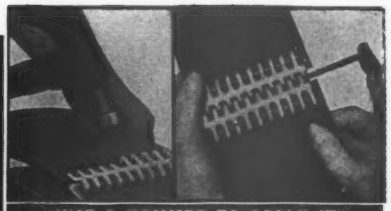
The COLUMBUS CONVEYOR CO., Columbus, Ohio

Some territory open for responsible representatives

Looking for Used Equipment?

Refer to the listings in the Broadcast Section in this issue for a wide variety of used and surplus machinery and supplies.

BELT LACING and FASTENERS for transmission and conveyor belts



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ALLIGATOR

Trade Mark Reg. U. S. Pat. Office

STEEL BELT LACING

World famed in general service for strength and long life. A flexible steel-hinged joint, smooth on both sides. 12 sizes. Made in steel, "Monel Metal" and non-magnetic alloys. Long lengths supplied if needed. Bulletin A-60 gives complete details.

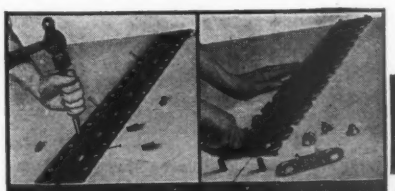
FLEXCO HD

BELT FASTENERS AND RIP PLATES

For conveyor and elevator belts of all thicknesses, makes a tight butt joint of great strength and durability. Compresses belt ends between toothed cupped plates. Templates and FLEXCO Clips speed application. 6 sizes. Made in steel, "Monel Metal", non-magnetic and abrasion resisting alloys.

By using Flexco HD Rip Plates, damaged conveyor belting can be returned to satisfactory service. The extra length gives a long grip on edges of rip or patch. Flexco Tools and Rip Plate Tool are used. For complete information ask for Bulletin F-100.

Sold by supply houses everywhere



"CONVEYOR BELTS EASILY FASTENED"

FLEXIBLE STEEL LACING CO.

4623 Lexington Street
Chicago, Ill.

SCREENING 60,000 Tons per Month

● Screening 60,000 tons of gravel per month is no easy job! — yet that is what a Link-Belt vibrating screen is doing in a Los Angeles, California, gravel pit!

Link-Belt Screens have proved themselves over the years in the effective screening of all types of materials. If you need a good screen — try Link-Belt.

9260

LINK-BELT COMPANY

2045 W. Hunting Park Ave., Philadelphia-40

Offices and distributors in all principal cities

SEND FOR CATALOG No. 1762

WRITE TODAY!

LINK-BELT Vibrating Screens

Uniform Separation

The new model GAYCO Centrifugal air separator makes possible the uniform and increased recovery of cement, lime and any other finely ground metallic or non-metallic material within a range of 80 to 400 mesh.

- Greater Capacity
- Cleaner Trailings
- 99% Through 325 Mesh
- 25% to 30% greater recovery of fines.
- Not affected by variation in speed or rate of feed.

Manufacturers also of "Reliance" Crushers, Screen, Elevators, Conveyors, Bin Gates, Grizzlies. Complete crushing, screening and washing plants for crushed stone, sand and gravel.

Universal Road Machinery Co.

RUBERT M. GAY DIVISION 117 Liberty St. New York, N. Y.

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FACTORY & LABORATORY, KINGSTON, N. Y.

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Keep your WIRE ROPE in good condition —on the job for the duration

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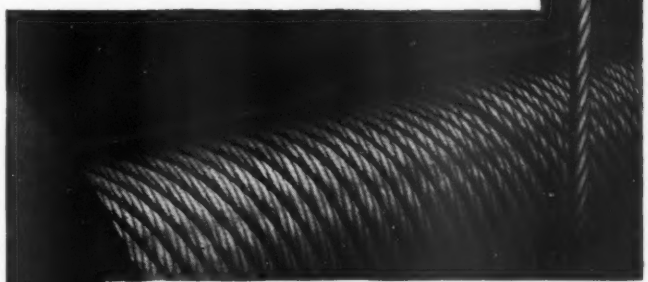

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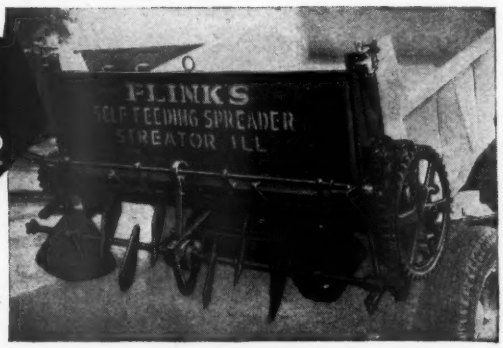

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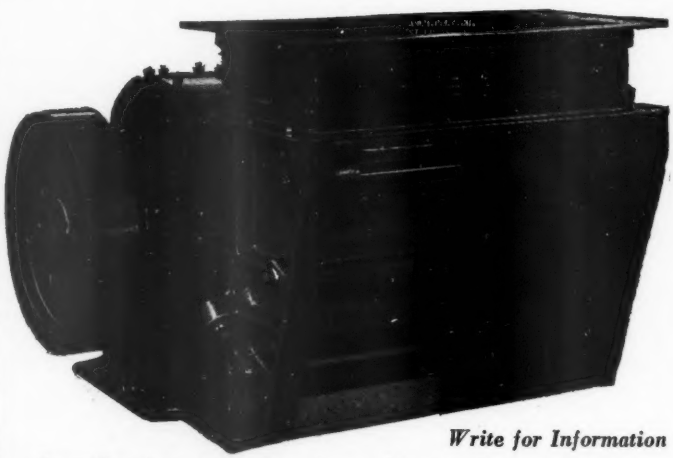

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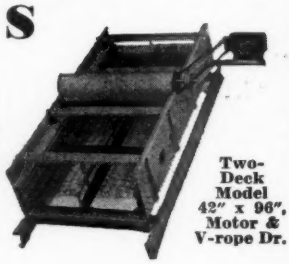

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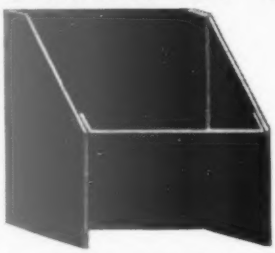

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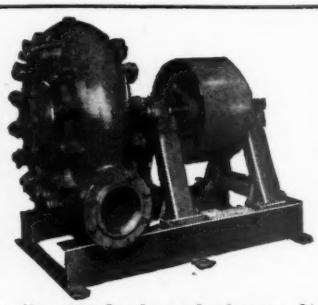

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Marion Model 460 Electric Shovel, 1½ yard
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1½ yd. Williams Clamshell, rehandling
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Hayward ¾ yd. Standard Orange Peel
⅝ yd. Williams Clamshell, digging
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Gyratory Crushers: K.V.S. 30, 37-S, 49; Traylor 8″; McCully 13″, 8″, 6″
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Porter 13 ton, Steam Saddle Tank, 36″ gauge
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35,184	18′4″x70′x27′5″ high
19,592	11′3″x40′6″x43′ high
10,440	12′x58′x15′ high
9,270	12′x51′6″x15′ high
7,460	10′x55′3″x13′6″ high
6,827	12′8″x44′x12′3″ high

Also Various Bins as follows:
4—1,650 cu. ft. and under
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5— 896 cu. ft. and under
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7— 532 cu. ft. and under
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11— 288 cu. ft. and under
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CRUSHERS—Cont'd

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95C BUCYRUS steam shovels on traction wheels with 3½ yard dippers. Rebuilt condition.

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1—I.R. Paving Breaker.
1—I.R. Tower Drill, Model X 71 for 1¼" Steel.
1—I.R. Riveting Hammer.
1—Boom & Dipper Sticks for P. & H. 700.
1—Wisconsin 4 Cyl. Gas Engine—110 H.P.

Will sell reasonable—Make us an offer.

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Farmington, Conn.

We own and offer

New & Used Equipment

SPECIAL

1—ROTARY CONVERTER — Westinghouse, 1000 KW, Serial No. 1930945, 250 volts D.C., complete with panelboard
1—TRANSFORMER — Westinghouse, 1100 K.V.A., Serial No. 463866, 3 phases
1—TURBINE—Westinghouse, 100 HP, 2700 RPM, direct connected to Westinghouse reducing gear, ratio 3 to 1
1—ANDERSON 150 HP DIESEL UNIT—with Westinghouse Generator complete with all auxiliaries. Late model. Fine condition

AGITATORS

23—For 12' x 12' Tanks

AIR COMPRESSOR

1—COMPRESSOR — Ingersoll-Rand, Type XB, cylinders, 11" x 14", capacity 582 cu. ft., driven by 104 HP Motor, complete with Harris system vacuum and pressure tank control and receiver tank, 3'6" x 7'

BLOWERS & FANS

2—FANS—60" Sturtevant
1—BLOWER—Clarage No. 50
1—FAN—Clarage, Type SP, 60"
2—FANS—Raymond Mfg. Co., Size No. 11

BUILDINGS — STEEL

1—80' x 120' x 20', Steel
1—45' x 220', Steel Structure
ETC.

DERRICK & CRANE

1—DERRICK—Steel Guy Derrick, 110' Mast, 90' Boom, equipped with Clyde three-drum hoist, General Electric 84 HP, 230 Volt D.C. totally enclosed motor
1—JIB CRANE—Brownhoist, No. 5991, 45' arm, capacity 4500 lbs.

DRYER — ROTARY

1—3½ x 44 ft.

KILNS & COOLERS

Various dimensions

ELEVATORS & CONVEYORS

2—ELEVATORS—48" x 18" x 60', steel case, buckets 14" x 6" x 11"
1—ELEVATOR—48" x 18" x 28', steel case, buckets 14" x 6" x 11"
1—ELEVATOR—48" x 18" x 30', steel case, buckets 14" x 6" x 11"
1—ELEVATOR—48" x 15" x 22', steel case, 6" x 7" x 9" buckets
1—ELEVATOR—48" x 15" x 30', steel case, 6" x 7" x 9" buckets
2—ELEVATORS—42" x 16" x 75', steel casing, 9" x 9" x 7"
1—BUCKET ELEVATOR—36" x 12" x 40', steel case, bucket 6" x 8" x 10"
1—BUCKET ELEVATOR—18" x 45" x 50', steel case, buckets 14" x 6" x 11"
1—DRAG PAN CONVEYOR—pan, 14" x 10" x 8", complete with 12" pitch, head and tail sprockets and gear speed reduction. 35 feet long
6—SCREW CONVEYORS—12" x 300' long, steel case
1—SCREW CONVEYOR—8" x 12', steel case

ELEVATORS & CONVEYORS—Cont.

1—SCREW CONVEYOR—12" x 35', steel case
1—SCREW CONVEYOR—12" x 160', steel case
2—SCREW CONVEYORS—12" x 110', no casing
1—SCREW CONVEYOR—12" x 30', steel casing
1—SCREW CONVEYOR—12" x 60', steel case
1—SCREW CONVEYOR—12" x 35', wood case
3—BELT CONVEYORS—30' long, 24" wide, bag carrier type

FEEDERS

2—Baily Feeders, Type No. 2, complete with steel hoppers, 8½ dia. x 12 ft. cone bottom, 12" screw conveyor, enclosed, 30' long bucket elevator, 36 x 12 x 25, steel housing
2—FEEDERS, Ferris Wheel Type, 4'6" wheel, 7 x 8 x 10 in. buckets, steel case

FLOATING EQUIPMENT

1—DREDGE — Manufactured by the American Steel Dredge Co., 64' x 30' x 6', Steel Hull complete with all auxiliaries ready to operate, locomotive type boiler—Union Steam Company Pump, Pyle National Company Generator, Hoist-Compound Engine 8" x 10" Cylinders, 2—28" x 15" Chain Drums, Bull Gear, Pinion and Brake for each drum, 200 ft. ¾" Chain on Drums, 100 ft. ¾" Chain spare, 2—8" x 15" Nigger Heads "Service Work," Spuds—1 each side Rack 30' long, 3" pitch, 7" face, 30" section of rack, separate steam engine for each spud, compound engine, 5" x 8" cylinders, gear to counter-shaft, worm gear to spud pinion, worm gear 30", pinion 6", boom 60' long, 11" x 12" box type, bucket 1¼ yd. Hayward.
1—TUG—Manufactured by the American Steel Dredge Co., 40' x 13' x 6', ¼" Steel Plate Hull, Boiler and Engine
3—SCOWS—Steel Construction, 58' x 16' x 6', built by Johnson Bros.
1—MACHINE BOAT—Johnson Bros., 54' x 17' x 6'6", complete with dump hopper, cutter, scraper, elevator and loader. Driven by compound steam engine.

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1—CLAY MILL—American Clay Machinery Company, Dry Pan, 9' diameter, with 2—48" x 10" grinding stones, cast iron construction
1—PUG MILL—15" diameter x 8½' with beaters
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3—TUBE MILLS—5' x 20', F. L. Smidth Co.
1—TUBE MILL—5 x 22 ft. F. L. Smidth Co.
3—KOMINUTERS—No. 66 F. L. Smidth Co.
1—RAYMOND MILL—4-roll
1—RAYMOND MILL—5-roll

SCREENS

4—SCREENS—4' x 5', W. S. Tyler Co. Hummer Screens, complete with generator
2—ROTARY SCREENS—18" x 8'

TRUCK SCALE

1—SCALE—Howe Truck Scale, capacity 40,000 lbs., platform 9' x 20', with Pilse ticket marker

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2 Rex No. 200 Double Pumpcretes with Waukesha six cylinder Gas Engines. Complete with Pugmill remixers, and 1200 ft. 8" pipe. Excellent condition.

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4 310 cu. ft. Portable I-R Compressors, Steel Wheels, Gasoline driven.

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All in fine condition!

2, RD 8 Caterpillar Diesel Tractors
1, RD 7 Caterpillar Diesel Tractor with LeTourneau Bulldozer
1, RD 7 Caterpillar Diesel Tractor with ATHEY Bulldozer
1, TD 14 International Diesel Tractor with Bucyrus Erie Bulldozer
1, Model 75 Caterpillar Diesel Tractor with push plate
1, Model 50 Caterpillar Diesel Tractor with LaPlant Choate Bulldozer
1, Model 70 Caterpillar Gas Tractor
1, Model 60 Caterpillar Gas Tractor with LeTourneau Bulldozer
2, Model "L-15" Gar Wood Scrapers
1, Model "J-12" LeTourneau Scraper
1, Model 12 Caterpillar Oil Patrol
1, 48" Caterpillar Elevating Grader
8, Allis Chalmers Speedace Tractor Wagons
5, Euclid Track Truck Hauling Units
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WE WILL FIGURE WITH YOU ON YOUR SURPLUS

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1 Trackson front end shovel—⅜ yd. dipper Int'l 10-20 engine — new pads now operating.....$1500.00
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3/16" PLATES

31" wide — 10'-15' long

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ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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ENDLESS "V" BELTS

"A" WIDTH All Sizes | "D" WIDTH All Sizes
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APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
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2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

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RUBBER HOSE

WATER HOSE
Each Length with Couplings Attached

I.D. Size	Length	per Length
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1"	50 "	8.00
	25 "	6.25
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	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

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- 110 ton aggregate
- 300 bbl. cement
- Conveyors
- Air compressor

Both will be available after Sept. 15

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1 Northwest—1 Byers gas. cat. dragline ¾ yd.
10 steel air dump cars 16 and 20 yd. 8 wh.
2 sets rolls ACCo 54x24—42x16
1 horiz. steel tank 10,000 gals. 3 compart.
1 dryer 50'x8'6"—1 kiln 110'x8'
2 draglines steam cat. mtd. Cl. 14-70' B. 2 yd.
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3 gyr. crushers 9K—9MCC—6K
3 steel hopper cars 36" ga. center dump 25 ton
A. V. Konsberg, 8 N. Dearborn St., Chicago

A FEW OF MANY BARGAINS

120 HP Fairbanks Diesel with Clutch Pulleys.
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870 HP 725 KVA 3 Unit Diesel Generator Plant.
1574 ft. Sullivan Synchronous M. D. Compressor.
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SKIP HOIST

36" dia. drum with 80 H. P. G. E. MTC motor, brake, & starter.

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NEW RAILS, Angle and Splice Bars, Bolts, Nuts, Spikes, Frogs, Switches, Tie Plates, and all other Track Accessories.
Most sizes usually available from warehouse stocks. Every effort made to take care of emergency requirements. Phone, Write or Wire

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1—SAND & GRAVEL DREDGE, steel construction, 14x40' pontoon, 25' rotary cutter, 70 HP Hercules Eng. 6" H&B pump, V belt driven, quick dump stone trap, 5 drum hoist, spuds, priming pump all complete. Bargain.
1—150 HP DOUBLE DRUM HOIST direct connected to two speed motor with all electrical controls. Used very little.
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Boilers—All Types & Sizes—Try Us

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10—25' lengths,
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12" diameter cement pumping hose with rubber flanges wire reinforced and malleable iron back up flanges.

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Portable Gravel Plant, 9x36 Universal jaw, double rolls, 3-deck Simplicity Vibrating Screen, A-1 condition, $3750.00.
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Motors and Generators, A.C. and D.C. for sale at attractive prices. New and Rebuilt. All fully Guaranteed. Send us your inquiries.

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60", 48" and 42" Extra Heavy Rubber Conveyor Belts; 2", 1½", 1⅛" and 1" IMPROVED PLOW STEEL, and PLOW—Steel, 8 x 19 Wire Rope, WIRE and Hemp Centers 200 to 2000 ft. lengths; for DREDGING, Drag Lines, Hoisting, etc.; Belts and Ropes practically NEW; ECONOMIC, Upright and Locomotive Type Boilers, COMPLETE; HIGH and low pressure; above located in EAST and Middle WEST; attractive prices.
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Bucyrus Class "14" 2½ yd. Steam Dragline 70 foot Boom. Boiler, engines, cab, boom and paint in exceptionally good condition. Located, Richmond, Va., also Erie ⅜ yd. Steam 40 foot boom combination dragline and clamshell in good repair. Located, Norfolk, Va.

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Fuller-Kenyon Cement Pump
New or Used
Must be in good condition.

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"WANTED"
Position as PLANT SUPERINTENDENT. Broad Supervisory and Administrative Experience in the Operation, Maintenance, Cost Control, etc., of PULVERIZING and GRINDING PLANTS; also CHEMICAL PROCESSING PLANTS. 47 years old, married, handle male and female personnel. Competent organizer. Available on short notice. Permanent position only. Address: P. O. Box No. 40, Meadville, Pennsylvania.

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Overhead electric traveling crane, 7½ to 10 ton, 60' to 80' span, 4 motor, A. C.
Two 300' and one 450' belt driven air compressors, 50 to 60 lbs. pr.
One 24" x 24" Jeffrey Coal Crusher.

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Portable or semi-Portable crushing plant 100-200 T. P. H. Correspondence invited with owner of Portable crushing plant for producing limestone aggregate. Will buy, but prefer to lease plant with seasoned operator, or will lease you deposit. Present material demand unlimited, post-war outlook most favorable. Finances immaterial for party who has the equipment, unquestioned character, and a record of successful past operations. Replies treated confidential.
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30", 36" or 42" wide
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all parts including belt.

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All Sizes of Tractors with Blades
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Small Shovels & Backhoes
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18" x 36" Stevenson Single Roll Crusher.
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Anchor Dble-bar Tamper Block Machine with power strike-off and Stripper, including 4, 8, 10" attachments, $750.00.
10" pallets 25c each.
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PRICED FOR QUICK SALE

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SLACKLINE CABLEWAY

85' Steel Tower—150 H.P. Motor—2 yd. Bucket. Complete in every detail and in best of condition.

10" DREDGE ELECTRIC

completely equipped—45 ft. ladder—chain cutter—will sell attached equipment without hull.

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50 Skips and Battleship Type, 2 to 6 Yds.
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5 Ton BROWNHOIST, 30 Ft. Boom Gas.
12 Ton NORTHWEST 50 Ft. Boom Gas.
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25 Ton LINK BELT K-48 Electric, 70 Ft. Boom.
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5 Yd. Monighan Diesel Dragline.

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¾ Yd., 1¼ Yd., 2 Yd., 4 Yd. & 8 Yd. MARION Electrics.
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46—KOPPEL 1½ Yd., 24 & 30 In. Ga., V Shaped.
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20—Std. Ga. 12 Yd., 16 Yd., 20 Yd. & 30 Yd. Cap.

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6x8 Continuous Pebble Mill.
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5'x22" HARDINGE CONICAL Dry Ball Mill.
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RAYMOND Auto. Pulverizer No. 0000, 0 & 3.
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SEPARATORS AND COLLECTORS
14 ft., 8 ft. and 12 ft. Separators

ROLL CRUSHERS
36x60 Fairmont Single Roll.
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24x24 & 36x16 & 36x20 Diamond Double Roll.

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10x8, 13x7½, 14x7, 15x9, 15x10, 16x9, 16x12, 16x10, 18x11, 20x8, 20x6, 20x10, 20x12, 20x17, 26x12, 30x15, 30x13, 36x30, 36x18, 36x14, 36x15, 36x9, 36x6, 38x18, 36x10, 36x24, 42x9, 48x36, 60x42, 84x66, 36x16, 9x36.
30x10 Gruendler Roller Bearing.

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18 in., 24 in., 30 in., 36 in. and 48 in. Symons Disc.
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4—10 TZ Traylor 4 Ft. Gyratory.
4—Nos. 5, 3 & 6 Austin Gyratory.
2—Traylor T-12 Bulldog Gyratory.
8 in. Traylor T. Gyratory, Telsmith No. 9.
17 Gates K—Nos. 3, 4, 5, 6, 7½, 8 & 9½.
10 Inch Austin Model 105.
6, 10 & 13 Inch Superior McCully.
KENNEDY: Nos. 19, 25, 27, 39 & 49.
16" Traylor.
7 Ft., 5 Ft., 4 Ft., 3 Ft. and 2 Ft. Symons Cone.

DRILLS
4—SANDERSONS 14 & LOOMIS 44.
7—Ingersoll-Rand Wagon Drills, FB & M2.
29T ARMSTRONG Well Drill.

HOISTING ENGINES
7 Gasoline 15, 40, 60 & 100 H.P.
17 Steam 7x10, 8½x10 and 10x12.
8 Electric 20, 35, 50, 60, 100 & 150 H.P.

HAMMER MILLS
4 Jeffreys: 24x18-A, 36x24-B, 42x36-E & 42x48-B.
Williams No. 1 Jumbo Jr., & No. 6 Universal.
Nos. 4, 6 & 8 Williams Jumbo.
No. 36 Am. Ring Roll.
Gruendler No. 6X.

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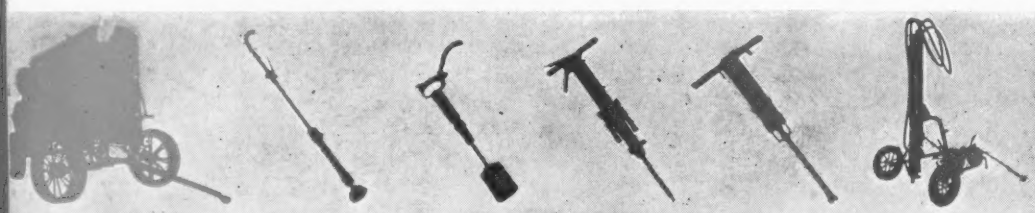

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